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Monongahela River Basin Water and Related Land Resources Study Report

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Ohio River Basin Commission
Suite 208-220
36 East Fourth Street
Cincinnati, Ohio 45202

Fred E. Morr
Chairman

John S. Hoffman
Vice-Chairman

Monongahela River Basin Water and Related Land Resources Level B Study Report

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Foreword

The Monongahela River Basin Water and Related Land Resources Study has been completed by the Ohio River Basin Commission pursuant to Section 204(3) of the Water Resources Planning Act of 1965 (PL 89-80). The Study Report includes an Environmental Impact Statement as required by Section 102(2)(c) of the National Environmental Policy Act (PL 90-190).

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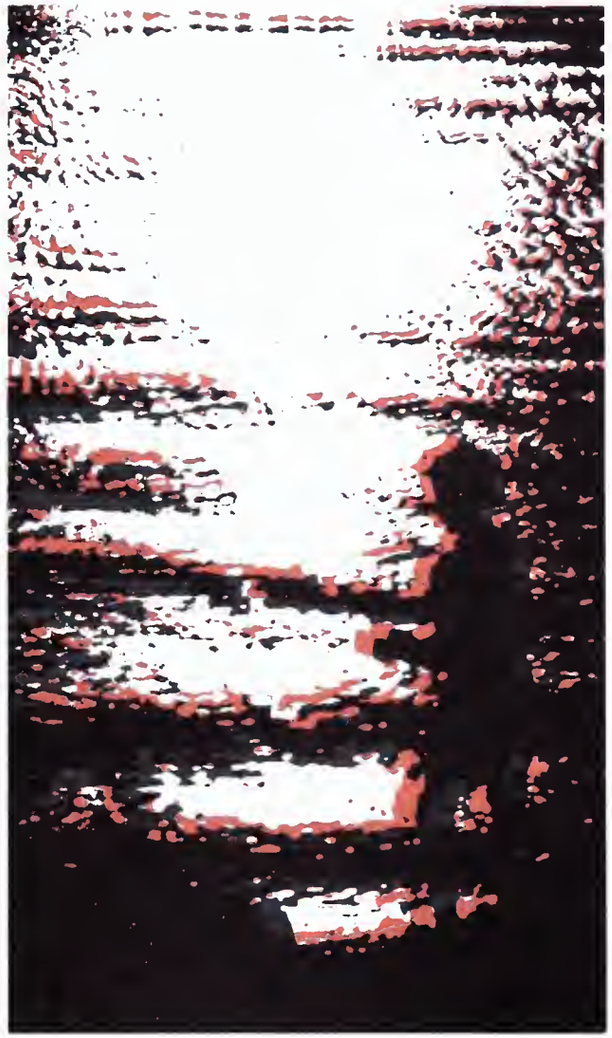


Acknowledgments

The Monongahela River Basin Study, by the Ohio River Basin Commission, marked the first study completion in the Nation using the ORBC's Comprehensive Coordinated Joint Plan (CCJP) methodology and Continuous Planning System (CPS) which is completely compatible with the Water Resources Council's New Approach to Level B Planning. By using existing information only and a judgmental process, the Commission was able to reduce the time of a Level B effort to two years, and the cost of $261,000. Most contributions by States and Federal agencies were from their normal operating budgets. While this time and cost might not be duplicated in all areas, the Study did successfully demonstrate that the New Approach is a workable alternative to the past efforts which took five to ten years and cost several million dollars.

All members of the Commission participated in the review of major draft reports in accomplishing the Monongahela Level B Study. In several cases comments and suggestions were provided by members with no direct study interest other than the desire to have a good Commission product. Study Direction and Plan Formulation Committee representatives were designated for only those Commission members that had a direct interest. In many cases the Federal representatives were from regions different from the Commission members. Committee participation also included representatives from organizations that did not have Commission membership.

As a support to the study, the ORBC Citizens' Advisory Council appointed a special task force whose members reviewed all material and were represented at each Committee meeting. As the study progressed, other members of the public, who were aware of the study through newsletters, workshops, and public meetings, became active as a part of the CAC Task Force. The Task Force membership included a cross section of backgrounds and occupations.

The cooperation in the Monongahela effort was excellent and in many cases the participation went beyond any occupational ties.

The following is a listing of the Commission and Committee members with an indication of the manner in which they participated.

	Reviewed Major Drafts	Reviewed All Plan Formulation Committee Material	Regularly Attended Plan Formulation Committee Meetings
Illinois	X		
Indiana	X		
Kentucky	X		
Maryland	X	X	
New York	X		
North Carolina	X		
Ohio	X		
Pennsylvania	X	X	X
Tennessee	X		
Virginia	X		
West Virginia	X	X	X
Department of Agriculture	X	X	X
Department of the Army	X	X	X
Department of Commerce	X	X	
Department of Health, Education and Welfare	X	X	
Department of Housing and Urban Development	X	X	
Department of the Interior	X	X	X
Department of Transportation	X	X	
Energy Research and Development Admin.	X	X	
Federal Power Commission	X	X	X
Environmental Protection Agency	X	X	X
Appalachian Regional Commission	X	X	X
Citizens' Advisory Council	X	X	X
Garrett County Md. Planning Comm.	X	X	
Ohio River Valley Water Sanitation Commission	X	X	
Region VI, W. Va. Planning and Development Council	X	X	
Region VII, W. Va. Planning and Development Council	X	X	
Southwestern Pennsylvania Regional Planning Comm.	X	X	X
Tri-County Council for Western Md.	X	X	
Wabash Valley Interstate Commission	X		
Water Resources Council	X	X	X
Water Resources Research Centers	X	X	

Public Participants From Citizens' Advisory Council

Name	CAC Interest Group	Location
Mr. Edward Bumgarner	Agriculture	Letart, W. Va.
Mr. William B. Ericson	Commerce & Industry	Pittsburgh, Pa.
Mr. Joseph F. Lagnese	Water Supply & Quality	Pittsburgh, Pa.
Mr. Warren Scott	Agriculture	Oakdale, Pa.
Dr. G. L. Simpson	Agriculture	Greenville, Ky.
Mr. James E. Spear	Agriculture	Philippi, W. Va.
Mr. Donald Stephens	Agriculture	Belle Vernon, Pa.
Mr. Louis Struble, Jr.	Transportation	Pittsburgh, Pa.
Mr. Don B. Tennant	Power	Greensburg, Pa.
Mrs. James Walsh	General Interest	Pittsburgh, Pa.

Public Participants At Large

Name	Organization	Location
Mr. Thomas W. Bragg	Upper West Fork River Watershed Assn.	Lewis Co., W. Va.
Mr. Gordon Chamblin	Allegheny Power Service Corp.	Greensburg, Pa.
Mr. Paul Emler, Jr.	Allegheny Power Service Corp.	Greensburg, Pa.
Mr. Robert LaMacchia	Southwestern Pennsylvania Regional Planning Comm.	Pittsburgh, Pa.
Mr. John McDonnell	Dravo Corp.	Pittsburgh, Pa.
Mr. Bennie Netzer	GAI Consultants, Inc.	Monroeville, Pa.
Mr. Kenny Parker	Upper West Fork River Watershed Assn.	Weston, W. Va.
Mrs. Peg Parker	Upper West Fork River Watershed Assn.	Weston, W. Va.
Mr. Neil D. Richmond	Carnegie Museum	Pittsburgh, Pa.
Mr. Dan Sentz	Southwestern Pennsylvania Regional Planning Comm.	Pittsburgh, Pa.
Mr. Thomas E. Vogel	Three Rivers Improvement & Development Corp.	Pittsburgh, Pa.
Mr. L. H. Weeks	West Penn Power Co.	Greensburg, Pa.
Mr. David Sweet	Mid-Monongahela Valley Council of Govts.	Belle Vernon, Pa.

The water pollution existing in the Monongahela River Basin is a detriment to current and future economic development. Improvement will lead to a better overall environmental quality, cleaner water supplies, and more recreational opportunities.

The large amount of coal available in the Monongahela Basin has been a mixed blessing for the local people. Appalachian coal has been a major source of income and employment, and is currently contributing toward making the United States self-sufficient in energy. Obtaining this coal from either strip or shaft mines has also resulted in serious environmental damages mostly by polluting the streams with acid and sediment. Existing enforcement programs, if sufficiently funded, can control problems emanating from active mines. However, abandoned mines are causing major pollution, aesthetic and other problems, and there is no adequate program for abatement measures. The ORBC recommended plan calls for $51 million over the next 15 years, as a minimum, to correct the abandoned mine problem. The cost is approximately 50 percent for deep mines and 50 percent for strip mines. Approximately 70 percent of the pollution is from deep mines. In view of the past nationwide benefits during the Industrial Revolution and the war years, the Commission recommends increased funding for abandoned mine drainage abatement at all levels,

Major Regional Issues

Reduction of pollution, primarily from abandoned mines, will provide the clean water supply necessary for environmental enhancement and economic development.

but in particular to the Federal level. To date, federal funding has addressed the problem through demonstration projects.

In addition to the energy and water quality problems, other major issues include balancing a recreation demand, heaviest in Pittsburgh, with a supply primarily available in the upper portion of the basin; eliminating flood damages in cities such as Pittsburgh, Pa., and Weston, W. Va., which have major existing flood plain development that would be too costly to relocate; and consideration of the inundation of environmental and agricultural lands by the proposed lakes of Rowlesburg, Davis, and Stonewall Jackson. Other needs and problems affecting the Monongahela Basin were considered; however, most of these had solutions which were easily determined, or the problem was not of a nature considered applicable to a Level B Study.

These major issues, the tradeoffs considered, and the judgmental process used are discussed below. Details of these and others are contained in supporting information available from the ORBC office upon request.

Detailed planning of three major multi-purpose reservoirs was considered to address the downstream demands of water supply recreation and flood damage abatement, as well as to provide peaking power. Davis would be primarily for power and recreation. Big Sandy and Rowlesburg would include flood damage abatement, low flow augmentation, and recreation. Rowlesburg could eliminate $4.6 million in average annual flood damages, while Big Sandy could eliminate $630,000 without Rowlesburg or $387,000 with Rowlesburg. A major portion of this damage reduction would be in Pittsburgh and further downstream on the Ohio Main Stem. The upstream damages are addressed by a combination of SCS watershed projects, flood insurance and zoning, and local protection. Big Sandy would be about one-tenth the size of Rowlesburg, but both have significant environmental conflicts which needed to be resolved. Rowlesburg was judged by far the better of the projects in solving the flood damage problems on the Monongahela and the Ohio Main Stem, and continued detailed planning was recommended. Big Sandy was eliminated from present consideration.

Analysis of the recreation demand indicated that only one of the three reservoirs was needed to provide surface water recreation. On the other hand, the natural environment of the Cheat River Basin, with its many free-flowing streams and abundant natural areas, was determined ideal for canoeing and whitewater recreation. The recommended plan for best use of the resource, while addressing the needs and problems of the lower Monongahela, is to have a recreational type river downstream from Rowlesburg with the flows augmented to provide for a whitewater facility which could be rafted throughout the summer, as opposed to the current stream which is raftable only a few times a year. The plan also includes a wild and scenic river on the Shavers Fork upstream from the reservoir. This resolution was considered a satisfactory tradeoff allowing for several types and intensities of recreational use. Detailed planning of the reservoir and the river was recommended within the framework provided by plan formulation with the recommendation for implementation postponed until the desired mix could be assured.

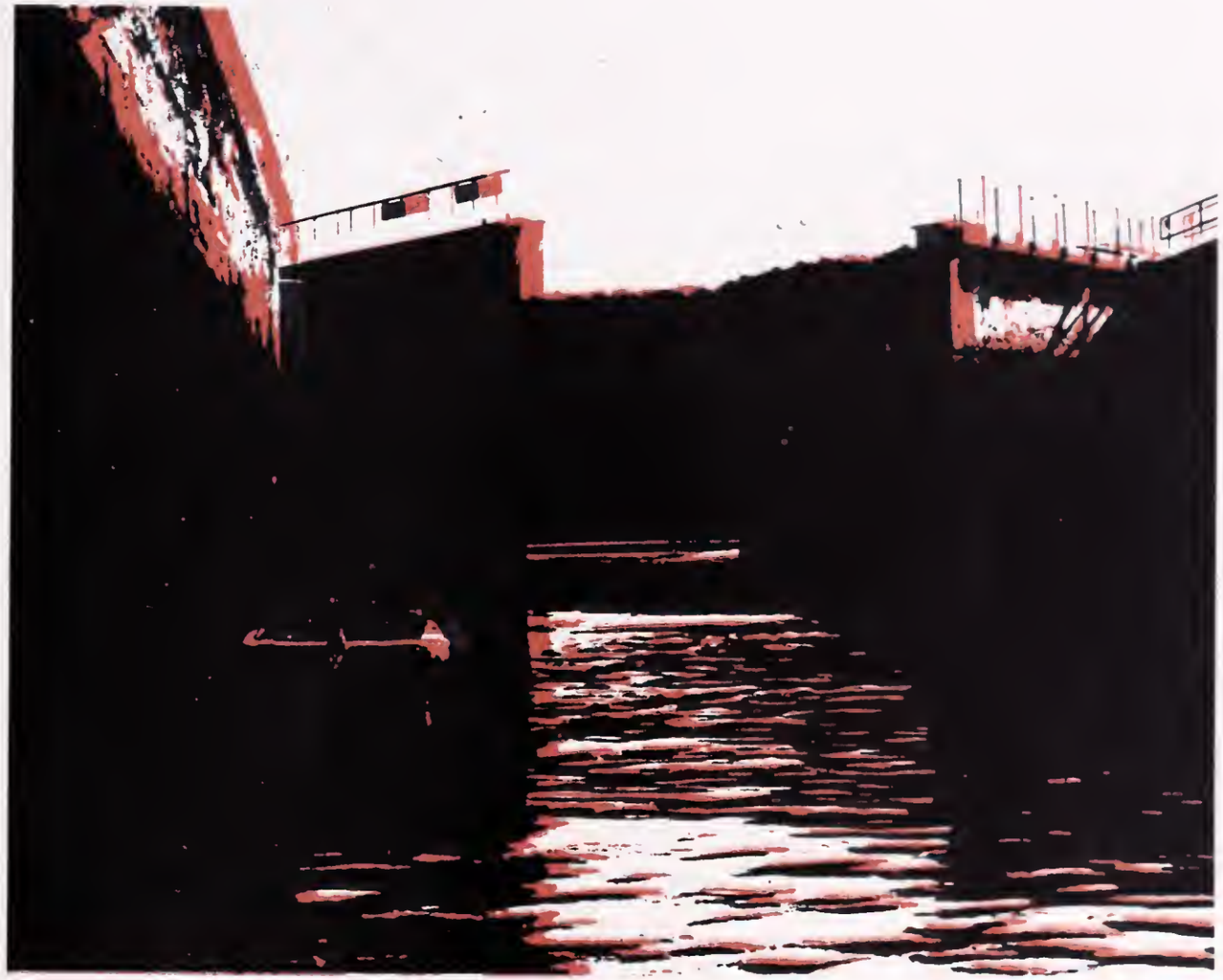
The Monongahela River Basin has a large demand for water supply in the future. The existing 7 day/10 year minimum low flow was used as a benchmark to maintaining aquatic life. If this flow is to be maintained, for water quality and aquatic life purposes, additional storage for low flow augmentation for water supply will be necessary to meet increased demands such as municipal, industrial, and power cooling requirements, and potential coal conversion facilities. An estimate of these demands indicates that if the current trend for development supporting energy requirement continues, the current 7-day/10 year low flow would be reduced by approximately 40 percent by 2020 at the mouth of the Monongahela River. While water supply is provided for in many of the recommendations, it is only of a local nature and would not have any major impact on the entire basin. However, if low flow augmentation were included, Rowlesburg Lake could satisfy approximately 70 percent of these estimated future demands. The cost sharing for these low flood augmentations is to be identified during the recommended continued detailed planning.

The Davis Lake Pumped Storage Project would provide 1,000 MW capacity of pumped storage peaking power, but the Commission did not recommend that this project proceed because of the unresolved conflict between the proposed project and the Canaan Valley Natural Area, part of which would be inundated by the project. The Canaan Valley is considered by many to be a unique natural area for both flora and fauna in the eastern United States.

The Davis Project and the Stonewall Jackson Lake Project are being considered in judicial hearings. The Davis Project is before the FPC. The Stonewall Jackson Project is scheduled for a court hearing to consider an injunction, primarily to require further consideration of an upstream watershed project

as an alternative. Stonewall Jackson Lake is recommended by the ORBC for implementation.

Recreation demand, as identified in the State Comprehensive Outdoor Recreation Plans, would be met in the upstream part of the basin by the recommended projects. It is noted that there would be no additional requirements for recreation in the Davis Project for which action is pending. In spite of this large upstream supply, consideration of the average travel time for a recreational experience leaves a large demand in the Pittsburgh area. A study of the recreation potential of the Monongahela Main Stem is proposed to satisfy a portion of this unmet demand.



Summary of Recommended Plan

The recommended plan for the Monongahela River Basin has been adopted by the Commission for the Level B Report and as a part of the Comprehensive Coordinated Joint Plan (CCJP). Each Commission member has agreed to actively pursue implementation of the recommendations. The plan includes recommended studies, projects, and nonstructural programs which the Ohio River Basin Commission has agreed are required to meet the needs of the Monongahela River Basin. The conclusions and recommendations are the result of consideration of all known existing information. The Level B study did not include any new data collection or project evaluations. Unless otherwise noted, where Preliminary Investigation or Detailed Planning is recommended, the Commission's recommendation applies only to that level of effort indicated. Upon completion of that level of effort or a major portion thereof, the Commission will again consider the alternatives and determine what additional action should be recommended.

The Plan Formulation Process began with the identification of needs, problems, and potential alternatives from existing information provided by various planning agencies. Where gaps or conflicts existed, the needs and problems were estimated or resolved by the Commission. Simultaneously, information was gathered regarding the land and water resource base - its existing use, capacity, and potential for development. The resultant plan formulation is considered a systematic process using judgment extensively. Inherent in this process is the concept that detailed quantification and rigid formulas are not necessary or desirable for each step. "Best judgment" was exercised by the Plan Formulation Committee based on:

1. Systematic consideration of the functional needs, resources, and known alternative solutions within each drainage basin. A total of 92 additional structural measures were considered as alternatives, but not selected. A complete display matching these alternatives to selected projects and programs would be prohibitive in length. However, they are included in the map on page 151, and backup information is available from the ORBC office.

2. Consideration of conflicts, complements, and alternatives among functions.

3. The overall objectives of National Economic Development (NED) and Environmental Quality (EQ) of the Federal Water Resources Council, and the Planning Objectives previously adopted by the Plan Formulation Committee (contained later in this report).

4. Consideration of the beneficial and adverse effects in the four Principles and Standards accounts and the projects and programs identified under the NED and EQ plans of the Principles and Standards application.

5. Inputs from the Public Participation Program, including a Citizens' Advisory Task Force, Newsletter, planning workshops, and public meetings.

6. Consideration of individual State and Federal agency analysis of the alternatives.

7. Consideration of input from special work groups for functions of Natural, Historic, and Recreation, and Water Quality.

Whenever additional information on needs, problems, resources, or alternatives becomes available the changes will be considered on a continuing basis, and the plan may be revised by the Members of the Commission at any quarterly meeting. The recommended plan is summarized in two tables: the first being a summary of total costs, and the second, a summary by implementing State agency. Additional details of information for the recommended plan, not in the summary or other sections of this report, are available at the Office of the Ohio River Basin Commission. The legend for these tables is as follows:

Principal Planning Organization

Md. — State of Maryland
Pa. — Commonwealth of Pennsylvania
W.Va. — State of West Virginia
ARMY — U.S. Department of the Army (Corps of Engineers)
HUD — U.S. Department of Housing and Urban Development
USDA — U.S. Department of Agriculture
USDI — U.S. Department of the Interior

Priority Group

I — Recommended within next 5 years
II — Recommended within 6 through 15 years
III — Recommended sometime beyond 15 years

Functional Needs Addressed

FDA — Flood Damage Abatement
NHR — Natural, Historic, Recreation
P — Power
T — Transportation
WQC — Water Quality Control
WS — Water Supply

Recommended Plan (Status)

DP — Detailed Planning
I — Implementation
PI — Preliminary Investigation
RD — Research and Data Collection

Principles and Standards

EQ — Environmental Quality Plan
NED — National Economic Development Plan
RA — Recommended Alternative Plan

Costs

are current figures unless otherwise noted.

Cost Sharing

by States or local governments has not been displayed separately and in most cases was not available; the figures shown represent total cost to all for the project.

ESTIMATED COST SUMMARY

	RECOMMENDED IMPLEMENTATION ($ Million)	RECOMMENDED STUDIES	
		Study ($ Thousand)	If Implemented ($ Millions)
States Only	11.0	566	0.5
States & USDA	0.1	100	0.6
States & USDI	15.0	235	-----
USDA	20.7	4275	40.6
ARMY	163.1	1715	1.4
HUD (Impl. by USDA)	0.1	-----	-----
HUD (Impl. by ARMY)	0.2	-----	-----
Appalachian Regional Comm.	------	30	-----
Mine Drainage Abatement	62.5	-----	-----
Domestic Sewage Facilities	175.8	-----	-----
TOTAL	448.5	6921	43.1

NOTE: Costs were not available for all State, USDA, USDI and Army projects, so that the actual cost will be higher. Cost sharing for Federal projects has not been determined. Domestic sewage facilities will require additional detailed planning. The recommended implementation program for priority group I (0-5 years) is $322.8 million.

PRIORITY	MAP ID.	PROJECT/PROGRAM	COSTS ($) STUDIES	COSTS ($) IMPLEMENTATION	SUPPORT AGENCY
GENERAL RECOMMENDATIONS					
I	800	Recreation opportunity should be considered at all federally financed lakes. The States recommend that the U.S. Congress consider legislation that would provide for more public access for lakes constructed with Federal funds.			
I	801	Provide for increased State and Federal funding for abandoned mine drainage and State enforcement programs for mine and industrial discharges. *			
	*	These may require U.S. Congressional legislation.			
USDA PL 566 WATERSHEDS – IMPLEMENTATION					
I	688	Elk Creek, WV		20,707,200 (1972)	
USDA PL 566 WATERSHEDS – DETAILED PLANNING					
II	346	Three Forks Creek, WV	350,000	2,515,000 (1966)	
II	348	Sandy Creek, WV	350,000	2,107,200 (1966)	
I	349	Leading Creek, WV	350,000	5,933,900 (1966)	
II	353	French Creek, WV	350,000	1,762,000 (1966)	
II	356	Mill Creek, WV	350,000	1,762,000 (1966)	
I	383	Hackers Creek, WV	350,000	2,652,000 (1970)	
I	394	Simpson Creek, WV	350,000	2,617,700 (1966)	
I	696	Sewickley Creek, PA	350,000	4,450,000 (1968)	
I	697	Upper Casselman River, PA & MD	350,000	4,450,000 (1968)	

PRIORITY	MAP ID.	PROJECT/PROGRAM	COSTS ($) STUDIES	COSTS ($) IMPLEMENTATION	SUPPORT AGENCY
USDA PL 566 WATERSHEDS-PRELIMINARY INVESTIGATIONS					
I	382	Lost Creek, WV	50,000	1,054,000 (1966)	
I	389	Upper Little Ten Mile Creek, WV	50,000	4,750,000 (1966)	
II	398	Bingamon Creek, WV	50,000	4,307,300 (1970)	
II	783	Little Creek, WV	50,000	538,500 (1970)	
I	785	Paw Paw Creek, WV	50,000	1,719,500 (1966)	
I	793	Mill Run, MD	50,000		
CORPS OF ENGINEERS PROJECTS — IMPLEMENTATION					
I	91	Stonewall Jackson Lake & State Park, WV		87,500,000 (1974)	
I	82	Grays Landing Lock & Dam, PA (L & D 7 replacement)		45,800,000 (1974)	
I	83	Point Marion Lock, PA (Lock 8 replacement)		29,800,000 (1974)	
CORPS OF ENGINEERS PROJECTS — DETAILED PLANNING					
I	87	Tygart Lake Master Plan Update, WV	72,000	Unknown	
I	112	Rowlesburg Lake, WV	Unknown	Unknown	
I	764	Tenmile Creek Local Protection Project	Unknown	1,360,000 (1974)	
I	766	Turtle Creek Basin Study, PA	450,000	Unknown	
I	1037	Master Plan Update at Youghiogheny Reservoir, PA & MD	75,000	Unknown	

PRIORITY	MAP ID.	PROJECT/PROGRAM	COSTS ($) STUDIES	COSTS ($) IMPLEMENTATION	SUPPORT AGENCY
CORPS OF ENGINEERS PROJECT – PRELIMINARY INVESTIGATIONS					
I	78,79,80	Replacement Study of Lock & Dam 2 & 3 & Lock 4, PA	253,000		
I	361	Phillippi Local Flood Protection Feasibility Study, WV*	15,000		
I	1040	Tygart Lake Study for the Feasibility of Power Production, WV*	25,000		
	*	Portions of Monongahela Level C Study			
FLOOD PLAIN IDENTIFICATION, ZONING & INSURANCE – CORPS OF ENGINEERS					
I	807	Flood Plain Identification Program (All Remaining Areas)	825,000		
I	350	Berkeley Run, WV		15,000	HUD
I	364	Buckhannon, WV		8,000	HUD
I	698	Youghiogheny Main Stem, PA		148,000	HUD
I	700	Friendsville, MD; Bear Creek, MD		5,000	HUD
I	758	Bruceton Mill, WV		3,000	HUD
I	819	Oakland, MD		5,000	HUD
I	820	Mountain Lake Park, MD		3,000	HUD
I	821	Lock Lynn Heights, MD		3,000	HUD
I	822	Deer Park, MD		3,000	HUD
I	823	Garrett County, MD		7,000	HUD

PRIORITY	MAP ID.	PROJECT/PROGRAM	COSTS ($) STUDIES	COSTS ($) IMPLEMENTATION	SUPPORT AGENCY
FLOOD PLAIN IDENTIFICATION, ZONING & INSURANCE – Department of Agriculture					
I	807	Flood Plain Identification Program (All Remaining Areas)	825,000		
I	1039	Elk Creek, WV		20,000	HUD
I	1043	Little Creek, WV		20,000	HUD
I	1044	Kincheloe Creek, WV		20,000	HUD
STATE OF MARYLAND – IMPLEMENTATION					
I		Orphan Mine Drainage Abatement Projects*	Unknown	1,117,000	Federal
I		Domestic Sewage Facilities*	Unknown	3,000,000	EPA
II	701	Grantsville, MD, Public Water Supply by Local Government	Unknown	195,000	USDA, ARC
I	704	Friendsville, MD, Public Water Supply by Local Government		880,000	USDA, ARC
I	1038	State Legislation to Require Reclamation at Mine Prospecting Sites			
STATE OF MARYLAND – DETAILED PLANNING					
I	702	Crellin, MD, Public Water Supply by Local Government	100,000	Unknown	USDA, ARC
I	703	Little Youghiogheny Sanitary District by State & Local Government, Deer Park, Oakland, Lochlynn Heights & Mountain Lake, MD	261,000	Unknown	USDA, ARC
I	794	Deep Creek Lake Management & Development Agreement, MD, with PENELEC Corp.	100,000	Unknown	
I	796	Piney Mountain State Park, MD	Administrative Only		

*Additional detailed planning required.

PRIORITY	MAP ID.	PROJECT/PROGRAM	COSTS ($) STUDIES	COSTS ($) IMPLEMENTATION	SUPPORT AGENCY
STATE OF MARYLAND – DETAILED PLANNING (continued)					
I	797	Protective Measures for Cranesville Swamp, MD, by WV Univ. & Nature Conservancy	25,000	Unknown	
I	888	Determination by Stream Reach of Minimum Low Stream Flow Requirements for Aquatic Life	50,000		
STATE OF MARYLAND – PRELIMINARY INVESTIGATIONS					
II	795	Meadow Mountain Scenic Highway, MD	Unknown	Unknown	
COMMONWEALTH OF PENNSYLVANIA – IMPLEMENTATION					
I		Orphan Mine Drainage Abatement Projects*	Unknown	31,700,000	Federal
II		Orphan Mine Drainage Abatement Projects*	Unknown	4,050,000	Federal
I		Domestic Sewage Facilities*	Unknown	53,033,300	EPA
II		Domestic Sewage Facilities*	Unknown	99,229,000	EPA
I	43	Myersdale Flood Protection Program, PA		980,000 (1974)	
I	44	Borough of Garrett & Buffalo Creek Flood Protection Project, PA		620,000 (1974)	
I	810	Greensburg Flood Protection (Tributary at Jacks Run), PA		450,000	
I	811	Somerset Boro Channel Improvement, PA		210,000	
I	812	Ski Facilities & Concession Bldg., Laurel Mountain State Park, PA		650,000 (Prelimin.)	

*Additional detailed planning required.

PRIORITY	MAP ID.	PROJECT/PROGRAM	COSTS ($) STUDIES	COSTS ($) IMPLEMENTATION	SUPPORT AGENCY
COMMONWEALTH OF PENNSYLVANIA – IMPLEMENTATION					
I	813	Swimming Pool for Handicapped, Laurel Hill State Park, PA		220,000 (Prelimin.)	
I	814	Park Improvement & Sanitary Facilities Kooser & Laurel Hill State Park, PA		4,000,000 (Prelimin.)	
I	815	Water Distribution & Sewer, Laurel Hill State Park, PA		1,071,000	
I	816	Trail Related Facilities, Laurel Ridge State Park, PA		675,000	
I	817	Day-Use Development, Ohio Pyle State Park, PA		1,000,000 (Prelimin.)	
I	818	Elizabeth Twp. Access Area, Monongahela River, PA		45,000 (Subj.)	
I	1038	State Legislation to Require Reclamation at Mine Prospecting Sites			
I	1042	Increase Withdrawals for E.H. Aldrich Water Co., Elrama, PA, from 40 to 80 mgd			
I	1049	Mt. Davis Facility Improvements		150,000	
COMMONWEALTH OF PENNSYLVANIA – DETAILED PLANNING					
I	699	Dunbar Flood Protection & Channel Modification, PA	Unknown	300,000 (1974)	
I	888	Determination by Stream Reach of Minimum Low Stream Flow Requirements for Aquatic Life	Unknown		

PRIORITY	MAP ID.	PROJECT/PROGRAM	COSTS ($) STUDIES	COSTS ($) IMPLEMENTATION	SUPPORT AGENCY
STATE OF WEST VIRGINIA – IMPLEMENTATION					
I		Orphan Mine Drainage Abatement Projects*	Unknown	9,309,000	Federal
II		Orphan Mine Drainage Abatement Projects*	Unknown	16,285,000	Federal
I		Domestic Sewage Facilities*	Unknown	20,552,291	EPA
I	1038	State Legislation to Require Reclamation at Mine Prospecting Sites			
STATE OF WEST VIRGINIA – DETAILED PLANNING					
I	888	Determination by Stream Reach of Minimum Low Stream Flow requirements for Aquatic Life	Unknown		
STATE OF WEST VIRGINIA – PRELIMINARY INVESTIGATION					
I	806	Develop Recommendations to Improve Land Management Practices for Erosion and Sediment Control, WV	30,000		
NATURAL, HISTORICAL & RECREATION – STATES & USDA – IMPLEMENTATION					
I	756	Sinks of Gandy Natural Area, WV		30,000 (1974)	
NATURAL, HISTORICAL & RECREATION – STATES & USDA – DETAILED PLANNING					
I	755	Dolly Sods Natural Area, WV	Unknown	600,000 (1974)	
I	760	Shavers Fork Wild & Scenic River Study, WV	100,000	Unknown	

*Additional detailed planning required

PRIORITY	MAP ID.	PROJECT/PROGRAM	COSTS ($) STUDIES	COSTS ($) IMPLEMENTATION	SUPPORT AGENCY
NATURAL, HISTORICAL & RECREATION – STATES & USDI – IMPLEMENTATION					
I	705	Youghiogheny Wild & Scenic River Study, PA & MD (PL 90-542) (national designation requires further analysis)		10–15,000,000	
NATURAL, HISTORICAL & RECREATION – STATES & USDI – DETAILED PLANNING					
I	739	Cheat Wild & Scenic River Study, WV (PL 90-542)	100,000	Unknown	
I	802	Study of Monongahela River's Recreational Potential from Fairmont, WV, to Mouth at Pittsburgh, PA	100,000	Unknown	
NATURAL, HISTORICAL & RECREATION – STATES & USDI – PRELIMINARY INVESTIGATIONS					
II	791	Casselman Wild & Scenic River Study, PA & MD (PL 90-542)	10,000	Unknown	ARC
I	792	Acquisition of Strip Mined Lands as Recreation & Ecological Areas (Demonstration Project), PA	15,000	Unknown	
I	804	Task Force to Examine Interstate Recreation Demand for Monongahela Basin, WV, PA & MD			
I & II	1041	Middle Fork River Wild & Scenic River Study, WV	10,000	Unknown	
APPALACHIAN REGIONAL COMMISSION – PRELIMINARY INVESTIGATIONS					
I	803	Study of Water Quality Improvement & Degradation in Monongahela Basin	30,000		USGS

Introduction and History

Objectives

The objectives for preparing a Level B Report for the Monongahela River Basin were:

1. **To provide decision makers at all levels of government with that information necessary to clearly identify problems and offer alternative solutions to direct, manage, and implement action for the development or protection of the Monongahela River Basin's water and related land resources.** Decision maker refers to any individual who has the authority to implement a portion of the water and related land program. This could be at any level of government - either the elected official or a program director under that elected official. The actual implementation will be carried out at the most appropriate level of government, and within that government structure by the most appropriate agency. In some cases implementation will require a coordinated effort among different levels of government or agencies. Portions of the recommended plan are appropriate for implementation by private industry.

2. **To develop a plan which will be multipurpose in scope, considering all facets of resource management, and offering a time phased array of viable alternatives to delineated resource problems in the basin.**

The following two objectives, as stated in the Water Resources Council's Principles and Standards for Planning, were used as primary planning objectives in the Monongahela effort:

1. **To enhance national economic development by increasing the value of the Nation's output of goods and services and improving national economic efficiency.**

2. **To enhance the quality of the environment by the management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural and cultural resources and ecological systems.**

The specific planning objectives were: (1) to ascertain critical areas of overbank flooding, inadequate drainage, and soil erosion damages; (2) to assess present and future needs of municipal, industrial, and rural water supply deficiency; (3) to assess critical reaches of streams which do not conform to established stream standards and to note areas of unsuitable groundwater; (4) to assess needs for water-based recreation facilities; (5) to assess the need for further investment in waterborne transportation; (6) to assess the needs for fish and wildlife enhancement and archeological and natural areas preservation; and (7) to assess the current and future basinwide and transfer needs for power.

A range of alternatives and recommendations to alleviate these problems was developed. The effects of the proposed alternatives were assessed with respect to economic development and the natural, cultural, and social environment.

Authority

The Ohio River Basin Commission was established by Executive Order 11578 on January 13, 1971, under the provisions of the Water Resources Planning Act of 1965, Public Law 89-80. In accordance with this Executive Order and the Water Resources Planning Act, the Commission is in the process of preparing and keeping up to date a Comprehensive Coordinated Joint Plan (CCJP) for the water and related land resources development within the Ohio River Basin. As a part of the CCJP the Commission completed this Level B Study of the Monongahela River Basin within the boundaries of the States of Maryland, Pennsylvania, and West Virginia. The planning approach is in accordance with the Water Resources Council's New Approach to Level B Planning and ORBC Policy, and used existing information only. Funding was provided by WRC for ORBC management and coordination. Throughout the plan formulation process, most contributions of time, effort, and existing information were provided by various governmental agencies, private industry, and interested citizens with no reimbursement from Level B funds.

WESTON, WEST VIRGINIA - Overbank flooding here can mean inundation of the entire business district.

22 Basin Description

The boundary of the Monongahela River Basin, including drainage basin breakdown used for the study, is shown on the following page. The Monongahela River drainage, together with that of the Allegheny River, comprises the headwaters of the Ohio River. The Monongahela River Basin occupies 7,384 square miles, lies in the eastern portion of the Ohio River Basin, and includes parts of the States of Maryland, Pennsylvania, and West Virginia.

The Monongahela River Basin is located in the Appalachian Plateau. The terrain is rugged and valleys are deep and narrow. Flat areas are limited to narrow flood plains and some terraces and flat-topped hills. Elevations of the basin range from approximately 4,600 feet above sea level in the headwaters of the Cheat River to about 700 feet above sea level at Pittsburgh, giving a maximum relief of nearly 4,000 feet. The climate is temperate, with an annual precipitation ranging from 36 to 70 inches.

Most of the agriculture, manufacturing, mining, and urban and industrial centers are located in the western half of the basin. Forested lands are more concentrated in the eastern half. Hay and livestock are the chief agricultural products. Much coal mining has occurred in the basin, and coal extraction continues to be important in the western third in the general vicinity of the West Fork River, the main stem of the Monongahela River, and in parts of Preston County, W. Va., and Somerset County, Pa. Industries are concentrated along the main stem of the Monongahela River with most of the steel industry located in the lower reach.

Major metropolitan areas are the Johnstown and Pittsburgh SMSA's and Clarksburg, Morgantown, and Fairmont, W.Va. Total population, including SMSA's, was approximately 3,200,000 in 1970.

In its early history the Monongahela Basin was inhabited by ancient Indians who left many remainders of archeological significance. The Virginia colonists used the Monongahela Valley as the principal route to the Ohio Valley and claimed both valleys in part as Virginia territory. George Washington made many trips into western Pennsylvania, the most notable being in 1753 and 1754, which ended in the defeat at Fort Necessity which touched off the French and Indian War.

The early colonial industries in the Monongahela Basin included the production of whiskey, glass, pottery, and barges. Centers of these industries included Morgantown, W. Va., and Brownsville, Greensboro, and New Geneva, Pa.

In 1840, private interests began operation of the first navigable river lock system in continuous use throughout the country. It was primarily for transport of the large quantities of whiskey produced in the basin. After the Whiskey Rebellion this navigation system provided easy transport of coal, contributing to the establishment of the steel industry at Pittsburgh. For several decades, the Monongahela navigation system has carried more coal tonnage than any other comparable navigation system.

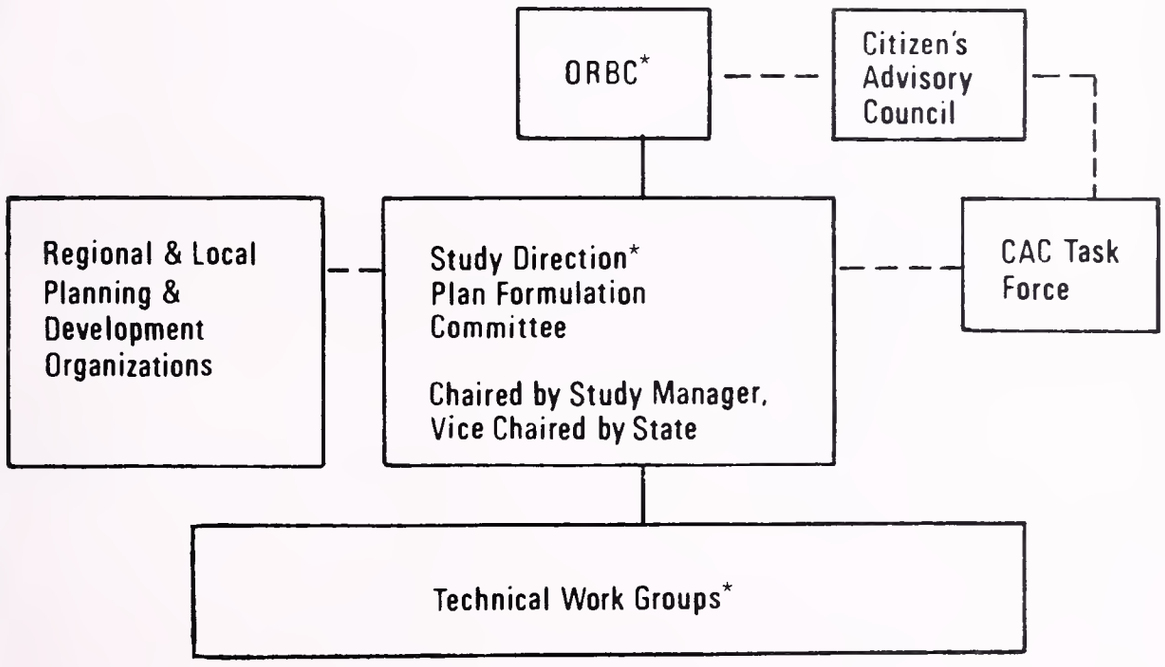
OHIO
PA.
BEAVER
BEAVER
OHIO RIVER
ALLEGHENY RIVER
PITTSBURGH
ALLEGHENY
WASHINGTON
GREENSBURG
WESTMORELAND
MONONGAHELA RIVER
WASHINGTON
SOMERSET
SOMERSET
W. VA.
PA.
LOWER
MONONGAHELA
FAYETTE
UNIONTOWN
YOUGHIOGHENY
WAYNESBURG
GREENE
PA.
MD.
MONONGALIA
MORGANTOWN
UPPER
MONONGAHELA
MARION
FAIRMONT
KINGWOOD
GARRETT
OAKLAND
HARRISON
PRESTON
GRAFTON
CLARKSBURG
TAYLOR
M.D.
W. VA.
WEST FORK
BARBOUR
PHILIPPI
CHEAT
PARSONS
TUCKER
WESTON
BUCKHANNON
LEWIS
ELKINS
TYGART
RANDOLPH
UPSHUR
POCAHONTAS
SUBREGION
DRAINAGE BASIN
Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE
10 0 10 20 Kilometers
10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO 1974

STUDY ORGANIZATION CHART


ORBC*
Citizen's Advisory Council
Regional & Local Planning & Development Organizations
Study Direction* Plan Formulation Committee
Chaired by Study Manager, Vice Chaired by State
CAC Task Force
Technical Work Groups*

*** Meetings open to the public.**

Participation and Coordination

The Monongahela effort was organized in accordance with the study organization chart on this page. As members of the Study Direction and Plan Formulation Committee, representatives of State, Federal, and regional agencies were responsible for providing input in accordance with the work plans and accounting sheets contained in the Plan of Study, and providing review comments and suggestions on draft material prepared by supporting technical work groups and ORBC staff. Formation of technical work groups was necessary for the Water Quality and the Natural, Historic, and Recreation functions. The Study Director also attended several regularly scheduled meetings and exchanged information with the advisory groups for the State Water Plans underway in Pennsylvania and West Virginia. All remaining functions were handled directly by the Plan Formulation Committee in its meetings (usually held quarterly). For the purpose of preparing a First Cut Plan, representatives from the States of Maryland, Pennsylvania, and West Virginia, the US Departments of Agriculture, Army, and Interior, and the US Environmental Protection Agency met as Working Board during the week of June 10, 1974.

A Citizens' Advisory Council (CAC) Task Force was formed in October 1973, to establish a nucleus of informed and articulate citizens for liaison between the Committee and the general public, and to provide expressions of the views and desires of the public with regard to the Monongahela Plan Formulation. The CAC Task Force received all Plan Formulation Committee material and its representatives attended the Committee meetings. In addition to this Task Force, public participation was developed and maintained through periodic publication of a newsletter, planning workshops sponsored by regional planning and development organizations in each State, and ORBC staff involvement at public meetings. Summaries of the degree of public participation effort achieved are contained in the following pages.

Newsletters

The Ohio River Basin Commission publishes on a regular basis a newsletter titled the "Coordinator". For the Monongahela effort, special editions of this newsletter were distributed to over 500 recipients, including the general public, special interest groups, chambers of commerce, libraries, news media, and local elected officials. In some cases such as regional planning and development councils, multiple copies were furnished for further distribution. The first newsletter was published in May 1974, and contained the Planning Objectives and Baseline of existing and underway projects. This newsletter also requested that those having special interest in the Monongahela complete a return postcard including their name and address. No comments were received on the Objectives of the Baseline. However, there was approximately a ten percent response on the return postcards. Subsequent distribution of the newsletter was increased based upon those completing the return postcard and additional names brought to the attention of the Commission.

In August 1974, the second newsletter was published and included maps outlining the needs and problems which had been identified by this time. There was an approximate one percent response to this second newsletter, with changes suggested in six areas of the needs and problems. The third newsletter, published in October 1974, contained maps and tables identifying the First Cut Plan contained in the draft report of July 1974. Response to this third newsletter was about four percent. At this point, the respondents who expressed strong interest in the study were put on the mailing list for all Plan Formulation Committee material and notices of meetings.

Replies to newsletters included nine specific added recommendations, as well as corrections and qualifications to the First Cut Plan. Consideration of comments led to deletion of one project, addition of five projects, and the establishment of high quality canoeing and whitewater stream designation.

One final newsletter transmitting the plan in the report will be published and comments will be considered at the regular Commission meeting.

Planning Workshops

Four planning workshops were held:

- October 15, 1974, at Oakland, Md., sponsored by the Garrett County Planning Commission.
- October 23, 1974, at Belle Vernon, Pa., sponsored by the Southwestern Pennsylvania Regional Planning Commission.
- October 28, 1974, at Buckhannon, W. Va., sponsored by the Region VII Planning and Development Council.
- December 3, 1974, at Fairmont, W. Va., sponsored by the Region VI Planning and Development Council.

A planning workshop booklet, summarizing the information contained in the First Cut Plan, was sent to potential attendees whose names were obtained from the sponsoring planning commission.

The actual attendance at the meetings varied from 9 to 18 and included local elected officials, local planners, and representatives of the planning commission and the State. The meetings were approximately four to five hours in length; each was opened with a 45-minute presentation on the Commission's Monongahela effort, with the remaining time devoted to general discussion and input to the planning effort. There were numerous suggested revisions, additions, and deletions presented to the Plan Formulation Committee by these planning workshops for consideration, all of which were subsequently considered by the Committee. Recommendations from the workshops led to the adoption of 11 additional projects and the establishment of a designation of high quality fishing streams. All suggestions can be reviewed in meeting summaries, available at the ORBC offices.

Public Meetings

No formal public meetings were scheduled for the Monongahela effort; however, presentations and discussions were held at regularly scheduled meetings of government agencies, special interest groups, universities, and others. In some cases, such as with the Advisory Groups for the Pennsylvania and West Virginia Water Plans, the participation by the ORBC staff has been on a continual basis. To date, special meetings have included the following: a Land Use Conference for Western Pennsylvania; a meeting of the Region VII Planning and Development Council in Buckhannon, W. Va.; special meetings for Open Space and Wild and Scenic Rivers in Western Pennsylvania; a meeting of the Upper West Fork River (W. Va.) Watershed Association; a general meeting sponsored by the Brownsville, W. Va., Historical Society and California State College; a boat trip to examine the recreational potential of the Monongahela River Basin sponsored by the Three Rivers Improvement and Development Corporation (TRIAD) and arranged by the Bureau of Outdoor Recreation and the Mid-Monongahela Valley Council of Governments; a meeting of the Upper West Fork River Watershed Association, and a meeting sponsored by California State College at Brownsville, Pa.

Of particular note are the opinions expressed at these meetings that an Upper West Fork River Watershed Project should be considered as an alternative to Stonewall Jackson Lake and that more funds should be provided for enforcment of industrial and mining pollution control. Both expressions were noted in the recommended plan.

These public meetings will continue through the summer of 1975 and comments will be considered at the regular Commission meetings.

Major Assumptions

Four major assumptions used during the Monongahela Level B effort are:

1. **Existing Information Only.** The effort was based on judgmental use of existing information only. Significant gaps were identified and recommendations made for special efforts to provide added information. Conflicts in the existing data were also resolved by a judgmental process.

2. **Economic and Demographic Projections.** No changes were made in existing information to conform to a single set of economic and demographic projections. The State projections were used for plan elements especially sensitive to projections, where some guidance was necessary and where variations existed. At the completion of the study a comparison (included later in this report) was made with the OBERS Series C and E projections.

3. **Base Year.** The base year for projections is the base year of existing available data. It was not considered necessary to develop one base year for the report, as programs and projects were formulated with respect to projected needs and problems rather than the existing situation.

4. **Legal and Institutional Arrangements.** Plan formulation was completed within existing legal and institutional arrangements. New legal and institutional arrangements were proposed only in those instances where significant needs and problems could not be adequately addressed by existing programs.

5. **Agricultural Price Standards.** Price standards published by WRC in October 1974, were not used unless they were already incorporated in the available existing information.

Planning Process

The plan formulation process began with the identification of needs, problems, and potential alternatives using existing information provided by various planning agencies. Where gaps or conflicts existed the needs and problems were estimated or evaluated by the Plan Formulation Committee. Simultaneously, information was gathered relating to existing and potential land and water resources. This resource information was displayed on a series of maps and overlays.

A second step of the plan formulation process was the convening of a Working Board consisting of representatives from the States of Maryland, Pennsylvania, and West Virginia, the U.S. Departments of Agriculture, Army, and Interior, and the U.S. Environmental Protection Agency. Planning accomplished by this Working Board was based on the accounting sheets and maps already developed and the Board's combined knowledge of the basin's needs, problems, and potential alternatives (solutions), and the basin's land and water resources.

Based upon individual State and Federal agency analysis of the alternatives and their representative's knowledge of the area, the Working Board developed a First Cut Plan by considering approximately 1,000 known alternatives, the objectives of National Economic Development and Environmental Quality (from the WRC's Principles and Standards), and planning objectives previously adopted by the Plan Formulation Committee. This analysis proceeded systematically by functional category within each drainage basin. Conflicts and complements among functions were considered during the planning process. The beneficial and adverse effects in the four Principles and Standards Accounts were considered.

Following completion of the First Cut Plan Formulation by the Working Board, the full Plan Formulation Committee continued with the plan formulation process by examining the interfunctional and interstate requirements, dependencies, and opportunities. Consideration was given to State planning objectives and to insuring compatibility with completed or underway state planning efforts. Land and water resources were examined from the standpoint of the tradeoffs that could be made by adopting various alternative plans.

The public participation effort, described in a previous section of this report, was intensified following the development of the First Cut Plan. Recommendations from this effort were considered in developing the final recommended plan. The Citizens' Advisory Task Force provided input at all phases of the process through review comments and regular attendance at plan formulation meetings.

An example of the plan formulation process is the solution to the flood damage problem in Pittsburgh. Because of the large amount of damages and the urbanization in the surrounding area, many alternatives (e.g., channel modification and upstream reservoirs) would have little effect. Existing efforts—nonstructural methods such as zoning, flood proofing and relocation — were already being employed to the maximum practical extent. After recognizing these conditions, the choice was narrowed down to three solutions within the Monongahela Basin: a flood wall at Pittsburgh; a major reservoir at Rowlesburg on the Cheat River; or a major reservoir on the Big Sandy River. Other reservoir sites upstream would have little effect on the damages at Pittsburgh. Rowlesburg was selected as the best solution since it would provide the greatest protection and there was a lack of State or local support for a flood wall or the Big Sandy project. The existing flood insurance program will supplement Rowlesburg. Also, while all projects could have been part of the NED Plan, Rowlesburg offered the best opportunity to make tradeoffs to eliminate environmental concerns. The final Commission recommendation called for detailed planning on the Cheat River leading to construction of Rowlesburg, simultaneous with the designation of a whitewater stream below the dam and a wild and scenic river upstream of the reservoir. Flow regulation of Rowlesburg is to be examined for benefits to the whitewater stream reach.

Bibliography

References to input are contained in the narrative summaries and on the maps for each function. In many cases the final information used represents a combination or alteration of reference material. In no case has the reference material been appended to this report; copies of most exist in the ORBC offices or can be obtained from the originating organization. An Inventory of Water and Related Land Studies was published separately by ORBC in August 1973.

Chronology

Level B funding provided	September 1973
Creation of Citizens' Advisory Council Task Force	October 1973
Plan of Study adopted	January 1974
Publication of first newsletter to public	June 1974
Identification of needs, problems, & potential alternatives	June 1974
Working Board Meeting	June 1974
First Draft Report	July 1974
Second Draft Report	December 1974
ORBC approval of Recommended Plan	April 1975
ORBC approval of Final Report for submission to Governors and Heads of Federal Agencies for official comments	July 1975

Recommended Plan

Flood Damage Abatement

Based on information from the Corps of Engineers, the Department of Agriculture, and the States, there are approximately $9.1 million of existing average annual damages in the Monongahela River Basin. Distribution by major basin is:

EXISTING AVERAGE ANNUAL FLOOD DAMAGES

Drainage Basin	Damages ($million)
Lower Monongahela	3.2
Upper Monongahela	0.3
West Fork	1.2
Tygart	0.7
Youghiogheny	3.6
Cheat	0.1
	9.1

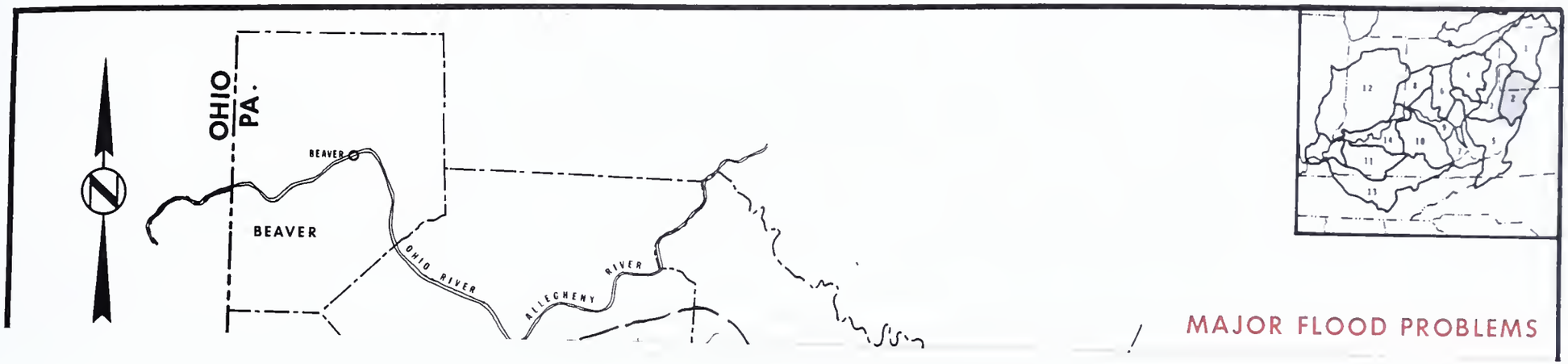
There are 23 completed and four underway projects which reduce past damages by approximately $10.9 million.

The Commission's plan includes recommendations for reducing existing damages by approximately $1.9 million for six projects for implementation, $2.9 million if projects proposed for study were implemented, and $1.6 million in areas where zoning and insurance was the selected solution. Insurance would actually be a compensation for damages rather than a reduction. There were 92 additional structural measures considered, but not selected.

The residual damages, not accounted for by a specific project, are approximately $2.7 million. These residual damages can be addressed through additional insurance and zoning, either as a supplement to structural measures or as the sole solution. Also, flood plain identification has been recommended for all major streams in the basin.

Displays following this narrative include a map of major flood problems, a table and map for the recommended plan, and a chart of the amount of flood damages satisfied by each portion of the recommended plan.

Flood control measures are recommended for both urban and rural locations.



Major Flood Problems

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MAJOR FLOOD PROBLEMS

SEVERE

MODERATE

OHIO
PA.

BEAVER

BEAVER

OHIO RIVER

ALLEGHENY RIVER

PITTSBURGH

ALLEGHENY

WASHINGTON

GREENSBURG

WESTMORELAND

MONONGAHELA RIVER

WASHINGTON

SOMERSET

SOMERSET

79°

40°

W. VA.
PA.

WAYNESBURG

UNIONTOWN

FAYETTE

GREENE

PA.
MD.

MONONGALIA

MORGANTOWN

MARION

FAIRMONT

KINGWOOD

GARRETT

OAKLAND

HARRISON

PRESTON

GRAFTON

CLARKSBURG

TAYLOR

MD.
W. VA.

BARBOUR

PHILIPPI

PARSONS

TUCKER

WESTON

LEWIS

BUCKHANNON

ELKINS

RANDOLPH

UPSHUR

POCAHONTAS

REF.: Subjective judgement based on current annual damages.

Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE

10 0 10 20 Kilometers

10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION

CINCINNATI, OHIO

1974

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	43	Myersdale Flood Protection Program	Somerset, Pa.	I	Pa.	FDA	Yes	No	$980,000 (1974) Alternatives Affected: 1 minor dam).
I	44	Borough of Garrett and Buffalo Creek Flood Protection Project.	Somerset Co., Pa.	I	Pa.	FDA	Yes	No	$620,000 (1974)
I	91	Stonewall Jackson Lake and State Park.	West Fork River above Weston, West Virginia	I	Army	NHR, WQC, WS, FDA	Yes	Yes	$87,500,000 (1974) - Project Cost Include: Water Quality Storage. Require Mine Drainage Abatement. In a coal bearing formation, buffer should be maintained between the lake and any active mining. A court hearing is presently being scheduled. Principal complaints have been the lack of a detailed consideration of upstream reservoirs and disagreements as to B/C calculations.
I	112	Rowlesburg Lake	Preston & Tucker Co., W. Va.	DP	Army	NHR,WS, FDA,P,WQC	Yes	No	At the request of West Virginia, the Corps is in the process of examining various alternatives to the project. Flow regulation for Cheat Wild & Scenic River should be considered. A re-evaluation of the need and feasibility of storage for low flow augmentation should be made. Water supply was not a part of the original authorization.
II	346	Three Forks Creek Watershed	Preston, Taylor, & Monongalia Co., West Virginia	DP	USDA	NHR, WQC, WS, FDA	Yes	Yes	$2,515,000 (1966) - Project Cost $ 350,000 - Study Cost (National Average)
II	348	Sandy Creek Watershed	Preston, Taylor & Barbour Co., West Virginia	DP	USDA	NHR, WS, FDA	Yes	Yes	$2,107,200 (1956) - Project Cost $ 350,000 - Study Cost (National Average)

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	349	Leading Creek Watershed	Randolph Co., W. Va.	DP	USDA	NHR, WS, FDA	Yes	Yes	$5,933,900 (1970) - Project Cost $ 350,000 - Study Cost (National Average)
I	350	Berkeley Run Flood Plain Identification Insurance & Zoning Program	Taylor Co., W.Va.	DP	HUD	FDA	Yes	Yes	$ 15,000 Flood Plain Identification
II	353	French Creek Watershed	Upshur Co., W.Va.	DP	USDA	NHR, FDA	Yes	Yes	$1,762,000 (1966) - Project Cost $ 350,000 - Study Cost (National Average)
II	356	Mill Creek Watershed	Barbour, W.Va.	DP	USDA	NHR, FDA	Yes	Yes	$1,762,000 (1966) - Project Cost $ 350,000 - Study Cost (National Average)
I	361	Phillippi (Local Flood Protection Feasibility Study)	Barbour Co., W.Va.	PI	Army	FDA	—	—	$ 15,000 - Study Cost Part of Monongahela Level C
I	364	Buckhannon Flood Plain Identification Zoning & Insurance	Upshur Co., W.Va..	DP	HUD	FDA	Yes	Yes	$ 8,000
I	382	Lost Creek Watershed	Harrison & Lewis Counties, W. Va.	PI	USDA	NHR, WS	—	—	$1,054,000 (1970) - Project Cost $ 50,000 - Study Cost (National Average)

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	383	Hackers Creek Watershed	Harrison, Lewis & Upshur Cos., West Virginia	DP	USDA	NHR, WQC, WS, FDA	Yes	Yes	$2,652,000 (1970) - Project Cost $ 350,000 - Study Cost (National Average) US Fish and Wildlife Service has provided guidelines for the channel modifications. West Virginia DNR has given conditional agreement to the project.
I	389	Upper Little Ten Mile Creek Watershed	Harrison Co., West Virginia	PI	USDA	NHR, WS, FDA	–	–	$4,750,000 (1966) - Project Cost $ 50,000 - Study Cost
I	394	Simpson Creek Watershed	Harrison, Taylor, & Barbour, W.Va.	DP	USDA	NHR, WQC, WS, FDA	Yes	Yes	$1,618,700 (1966) - Project Cost $ 350,000 - Study Cost (National Average) The watershed has mine drainage problems.
II	398	Bingamon Creek Watershed	Harrison & Marion Counties, West Virginia	PI	USDA	FDA	–	–	$4,307,300 (1970) - Project Cost $ 50,000 - Study Costs
I	688	Elk Creek Watershed & Upshur Counties	Barbour, Harrison & Upshur Counties, West Virginia	I	USDA	NHR, WQC, FDA	Yes	Yes	$20,707,200 (1972) - Concurrent mine drainage abatement is now underway by the State of West Virginia.

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	696	Sewickley Creek Jacks Run Watershed	Westmoreland Co., Pa.	DP	USDA	NHR, FDA	Yes	Yes	$4,450,000 (1968) - Project Cost $ 350,000 Study Costs (National Average)
I	697	Upper Casselman River Watershed PL 566	Somerset Co., Pa. Garrett Co., Md.	DP	USDA	NHR, FDA, WQC, WS	Yes	Yes	$4,450,000 (1969) - Project Costs $ 350,000 - Study Costs (National Average) Requires mine drainage abatement.
I	698	Youghiogheny Main Stem Flood Plain Identification-Zoning & Insurance	Connellsville to Mile 17 - Yough. River below Yough. Dam.	DP	Pa., Army, HUD	FDA	Yes	Yes	$ 148,000 - Flood Plain Identification
I	699	Dunbar Flood Protection & Channel Modification	Fayette Co., Pa.	DP	Pa.	FDA	Yes	No	$ 300,000 (1974)
I	700	Friendsville, Md. and Bear Creek Flood Plain Identification - Zoning & Insurance	Garrett Co., Md.	DP	HUD, Army	FDA	Yes	Yes	$ 5,000 Flood Plain Identification
I	758	Bruceton Mill Flood Plain Identification Zoning & Insurance Study	Preston Co., W.Va.	DP	HUD	FDA	Yes	Yes	$ 3,000 - Flood Plain Identification
I	764	Tenmile Creek - Local Protection Project Marianna & Vicinity	On Tenmile Creek in and near Marianna, Pa.	DP	Army	FDA	Yes	NO	$1,360,000 (1974) for construction.
I	766	Turtle Creek Basin Study	Westmoreland Co. Pa.	DP	Army	NHR, WQC, WS, FDA	Yes	Yes	$ 450,000 (1974) - Study Cost

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	783	Little Creek Watershed	Marion County, W. Va.	PI	USDA	NHR, FDA	—	—	$ 538,500 (1970) - Project Cost $ 50,000 - Study Cost
I	785	Paw Paw Creek Watershed	Marion and Monongalia Cos., W. Va.	PI	USDA	NHR, WS, FDA	Yes	Yes	$1,719,500 (1966) - Project Cost $ 50,000 - Study Cost (Subjective)
I	793	Mill Run Watershed	Somerset, Pa. Garrett, Md.	PI	USDA	FDA	—	—	$50,000 Study Costs
I	807	Flood Plain Identification Program	Basinwide	PI	States, Army, USGS, USDA	FDA	Yes	Yes	A Cost of $1,650,000 was estimated based on the three-fourths of the total miles of stream shown on the maps in this report; minus those efforts which are now complete, underway, or recommended in other parts of this plan. A rate of $2,000 per mile was used. Cost allocations to agencies should reflect staff capabilities, proportionment of agriculture and urban areas, etc. A recommendation for zoning is not a part of this program.
I	810	Greensburg Flood Protection (Tributary at Jacks Run)	Westmoreland, Pa.	I	Pa.	FDA	Yes	No	$ 450,000
I	811	Somerset Boro Channel Improvement	Somerset, Pa.	I	Pa.	FDA	Yes	No	$ 210,000
I	819	Oakland Flood Plain Identification - Zoning & Insurance	Garrett, Md.	DP	HUD/ Army	FDA	Yes	Yes	$ 5,000 Flood Plain Identification
I	820	Mountain Lake Park Flood Plain Identification - Zoning and Insurance	Garrett, Md.	DP	HUD/ Army	FDA	Yes	Yes	$ 3,000 Food Plain Identification

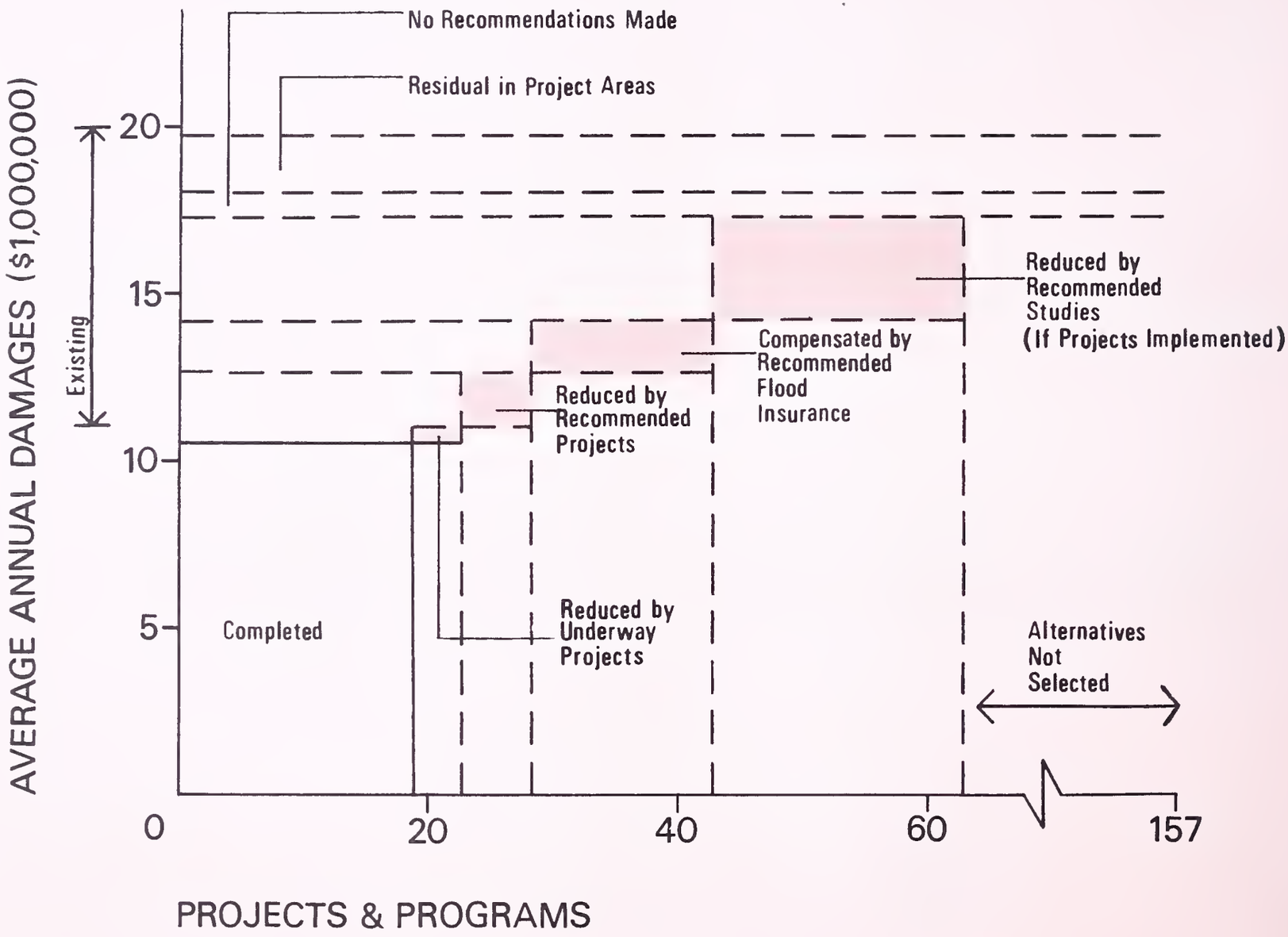
RECOMMENDED PLAN

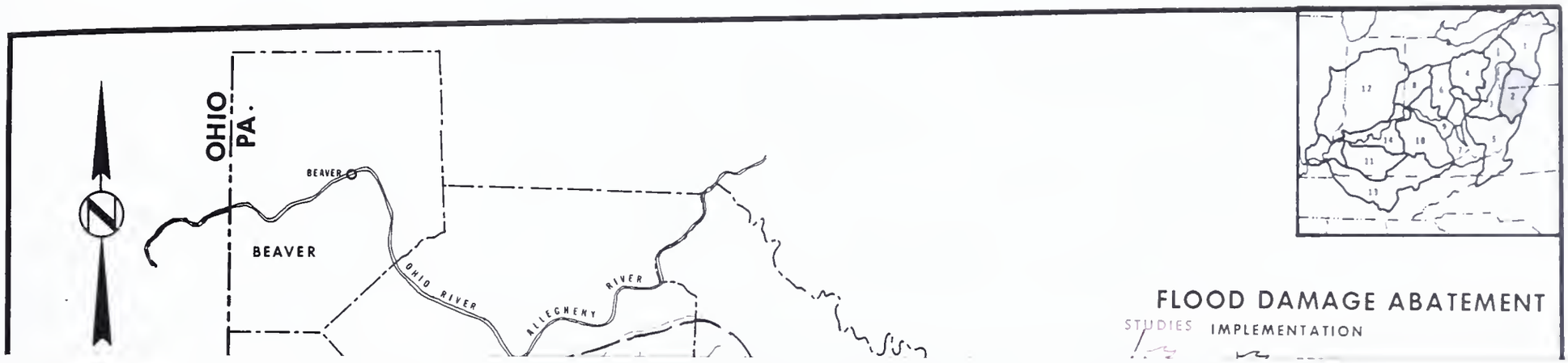
PRIORITY	MAP ID	PROJECTS/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	EQ	COSTS & COMMENTS
I	821	Loch Lynn Heights Flood Plain Identification - Zoning and Insurance	Garrett, Md.	DP	HUD/ Army	FDA	Yes	Yes	$ 3,000 Flood Plain Identification
I	822	Deer Park Flood Plain Identification - Zoning & Insurance	Garrett, Md.	DP	HUD/ Army	FDA	Yes	Yes	$ 3,000 Food Plain Identification
I	823	Garrett County Flood Plain Identification - Zoning & Insurance	Garrett, Md.	DP	HUD/ Army	FDA	Yes	Yes	$ 7,000 Flood Plain Identification
I	1039	Elk Creek Flood Plain Identification Zoning & Insurance Study	Barbour, Harrison & Upshur Cos.	DP	USDA/ HUD	FDA	Yes	Yes	$ 20,000 Flood Plain Identification

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS		COSTS & COMMENTS
							NED	EQ	
I	1043	Little Creek Flood Plain Identification - Zoning & Insurance	Marion Co., W. Va.	DP	USDA/ HUD	FDA	Yes	Yes	$ 20,000 Flood Plain Identification
I	1044	Kincheloe Creek Flood Plain Identification - Zoning & Insurance	Harrison & Lewis Counties, W. Va.	DP	USDA/ HUD	FDA	Yes	Yes	$ 20,000 Flood Plain Identification

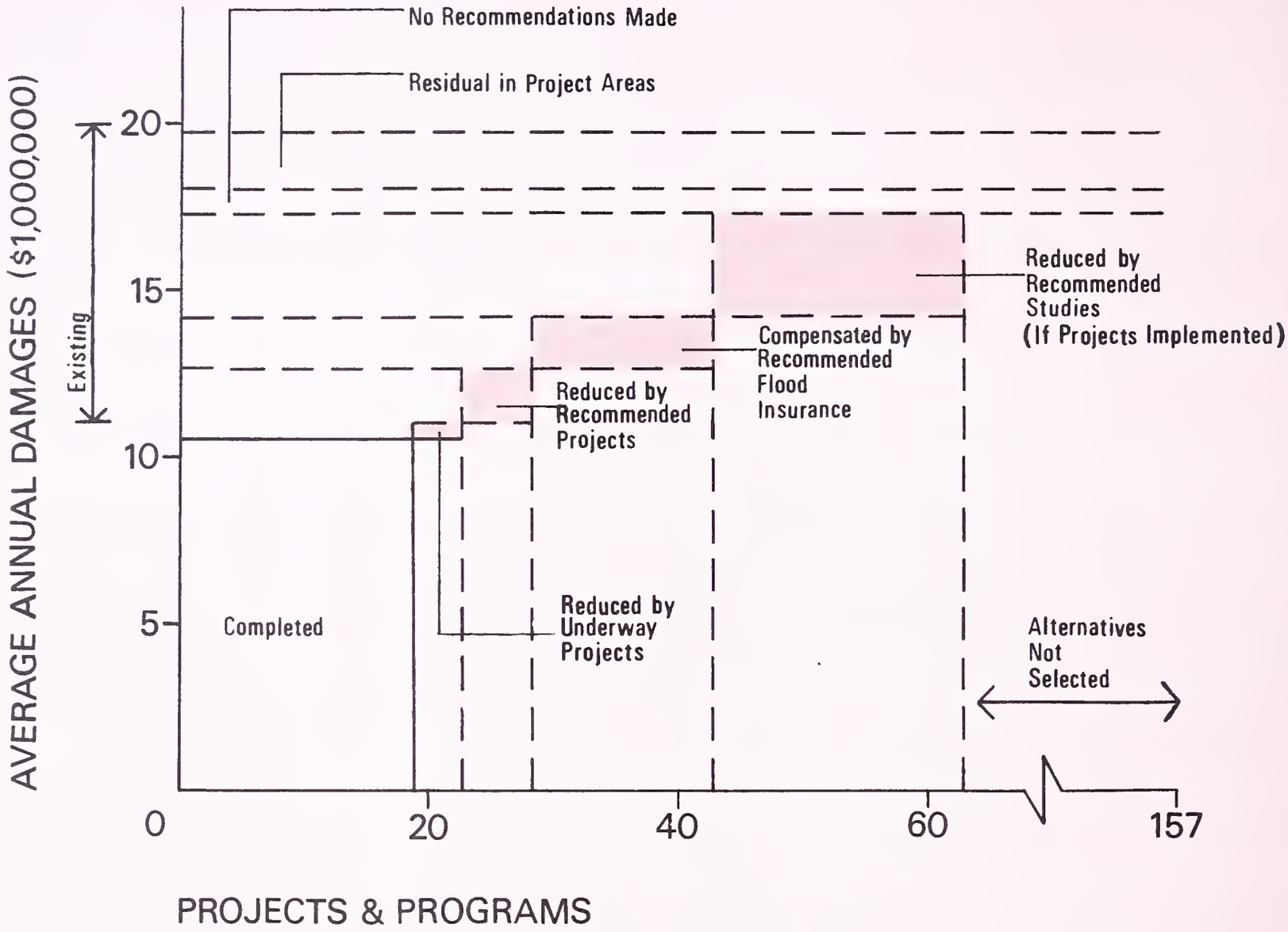
MONONGAHELA FLOOD DAMAGE





Recommended Plan for Flood Damage Abatement

MONONGAHELA FLOOD DAMAGE



FLOOD DAMAGE ABATEMENT

STUDIES IMPLEMENTATION

- RESERVOIR
- WATERSHED PROJECT
- LOCAL PROTECTION PROJECT
- REGULATION - INSURANCE
- ENVIRONMENTAL CORRIDOR
- FLOOD FORECASTING

OHIO
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W. VA.
PA.
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MD.
W. VA.

BEAVER
ALLEGHENY
WASHINGTON
GREENE
FAYETTE
WESTMORELAND
SOMERSET
MONONGALIA
MARION
HARRISON
TAYLOR
BARBOUR
PRESTON
TUCKER
RANDOLPH
UPSHUR
LEWIS
POCAHONTAS
GARRETT

BEAVER
PITTSBURGH
GREENSBURG
WASHINGTON
WAYNESBURG
UNIONTOWN
SOMERSET
MORGANTOWN
FAIRMONT
KINGWOOD
GRAFTON
CLARKSBURG
PHILIPPI
PARSONS
WESTON
BUCKHANNON
ELKINS
OAKLAND

OHIO RIVER
ALLEGHENY RIVER
MONONGAHELA RIVER
Youghiogheny River
Cheat River
Tygart Valley River
West Fork River
Buckhannon River
Middle Fork River
Deep Creek Lake

698
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820
821

RECOMMENDED PROJECTS & PROGRAMS

Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE

10 0 10 20 Kilometers

10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO 1974

Water Supply

There are currently no specific **minimum low flow** requirements established by stream reach. In general, the existing 7 day/10 year minimum low flow is used as a benchmark to maintaining aquatic life. For many stream reaches this exceeds an adequate depth and for other reaches it is entirely inadequate. A U.S. Fish and Wildlife Service Study (North Atlantic Regional Water Resources Study, 1972) recommended that minimum be the greater of the existing 7-day/10-year low flow or minimum instantaneous discharge of 0.25 cfs per square mile of drainage area. At all gaged points in the basin the 7-day/10-year low flow is always less than 0.25 cfs per square mile; most are around 0.10 cfs per square mile.

Based on an analysis of available data being developed for State Water Plans, the consumptive requirements for municipal, industrial (excluding energy production), and agricultural uses are estimated to increase from approximately 78 mgd at present to 93 mgd by the year 2020.

A total estimate of water consumption related to energy production was not possible because of the ever-changing technology, the lack of a specific siting plan, and the fact that major downstream energy facilities would consume water originating in the Monongahela Basin. Although no specific plans were provided, coal gasification plants under current technology for a 350 million cubic feet per day "high BTU" plant would, depending on the process, consume approximately 21 mgd. Average annual consumptive cooling requirements for a 1000 MW power station with an 85 percent capacity factor are estimated by the Allegheny Power Service Corporation to be 10 mgd for fossil fuel and 15 mgd for nuclear. This includes station auxiliaries for both types and SO_2 removal for fossil fuel. FPC preliminary estimates of cooling water requirements indicate consumptive use will increase from 12 mgd to 205 mgd by the year 2030. The results of this comparison indicate major reductions in the 7-day/10-year low flow for: Tygart River (Grafton to Fairmont) - 22 percent, Cheat River (Rowlesburg to Pt. Marion) - 76 percent, and Youghiogheny River (Connelsville to McKeesport) - 36 percent.

Displays following this narrative include a table and map for the recommended plan and a chart comparing the 7-day/10-year low flow requirements with the recommended plan.

The chart has been developed for the mouth of the Monongahela at Pittsburgh and it should be noted that the severity of the problem is greater on some of the tributaries. The estimated 2020 demand for consumptive use is displayed as an addition to the existing low flow, but it could also be viewed as reducing the existing 7-day/10-year low flow by 40 percent. The demand estimate consists of 15 mgd for municipal, industrial, and agricultural uses, 205 mgd for power cooling, and 40 mgd for coal gasification. The actual demand might be above or below this and the proportions might be different. Any amount for enhancement of aquatic life would be in addition. The recommended plan can meet this demand; however, the majority of the water supply storage would have to be provided from Rowlesburg Lake. The major alternative solutions to the recommended plan are having each user provide its own single-purpose storage; not allowing further economic development and environmental enhancement; or further depletion of existing low flow.

Because of the many unknowns and variables discussed above, the Commission recommends, as a beginning step in determining future consumptive water demands, each State should determine minimum low flow requirements by stream reach, based on depth and flow velocity for maintining and/or enhancing aquatic life.

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	91	Stonewall Jackson Lake & State Park	West Fork River above Weston, West Virginia	I	Army	NHR, WQC, WS, FDA	Yes	Yes	$87,500,000 (1974) Include: Water Quality Storage. Require Mine Drainage Abatement. In a coal bearing formation, buffer should be maintained between the lake and any active mining. A court hearing is presently being scheduled. Principal complaints have been the lack of a detailed consideration of upstream reservoirs and disagreements as to B/C calculations.
I	112	Rowlesburg Lake	Preston & Tucker Co., WV	DP	Army	NHR,WS, FDA,P,WQC	Yes	No	At the request of West Virginia, the Corps is in the process of examining various alternatives to the project. Flow regulation for Cheat Wild and Scenic River should be considered. A re-evaluation of the need and feasibility of storage for low flow augmentation should be made. Water supply was not a part of the original authorization.
II	346	Three Forks Creek Watershed	Preston, Taylor & Monongalia Co., WV	DP	USDA	NHR, WQC, WS, FDA	Yes	Yes	$2,515,000 (1966) - Project Cost $ 350,000 - Study Cost (National Average)
II	348	Sandy Creek Watershed	Preston, Taylor & Barbour Co., WV	DP	USDA	NHR, WS, FDA	Yes	Yes	$2,107,200 (1966) - Project Cost $ 350,000 - Study Cost (National Average)
I	349	Leading Creek Watershed	Randolph Co., WV	DP	USDA	NHR, WS, FDA	Yes	Yes	$5,933,900 (1970) - Project Cost $ 350,000 - Study Cost (National Average)

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	382	Lost Creek Watershed	Harrison & Lewis Co., WV	PI	USDA	NHR, WS, FDA	?	?	$1,054,000 (1970) - Project Cost $ 50,000 - Study Cost (National Average)
I	383	Hackers Creek Watershed	Harrison, Lewis & Upshur Co., WV	DP	USDA	NHR, WQC, WS, FDA	Yes	Yes	$2,652,000 (1970) - Project Cost $ 350,000 - Study Cost (National Average) US Fish and Wildlife Service has provided guidelines for the channel modification. WV DNR has given conditional agreement to the project.
I	389	Upper Little Ten Mile Creek Watershed	Harrison Co., WV	PI	USDA	NHR, WS, FDA	?	?	$4,750,000 (1966) - Project Cost $ 50,000 - Study Cost
I	394	Simpson Creek Watershed	Harrison, Taylor & Barbour Co., WV	DP	USDA	NHR, WQC, WS, FDA	Yes	Yes	$2,618,700 (1966) - Project Cost $ 350,000 - Study Cost (National Average) The watershed has mine drainage problems.
I	697	Upper Casselman River Watershed PL 566	Somerset Co., PA Garrett Co., MD	DP	USDA	NHR, FDA, WQC, WS	Yes	Yes	$4,450,000 (1969) - Project Cost $ 350,000 - Study Cost (National Average) Requires mine drainage abatement.

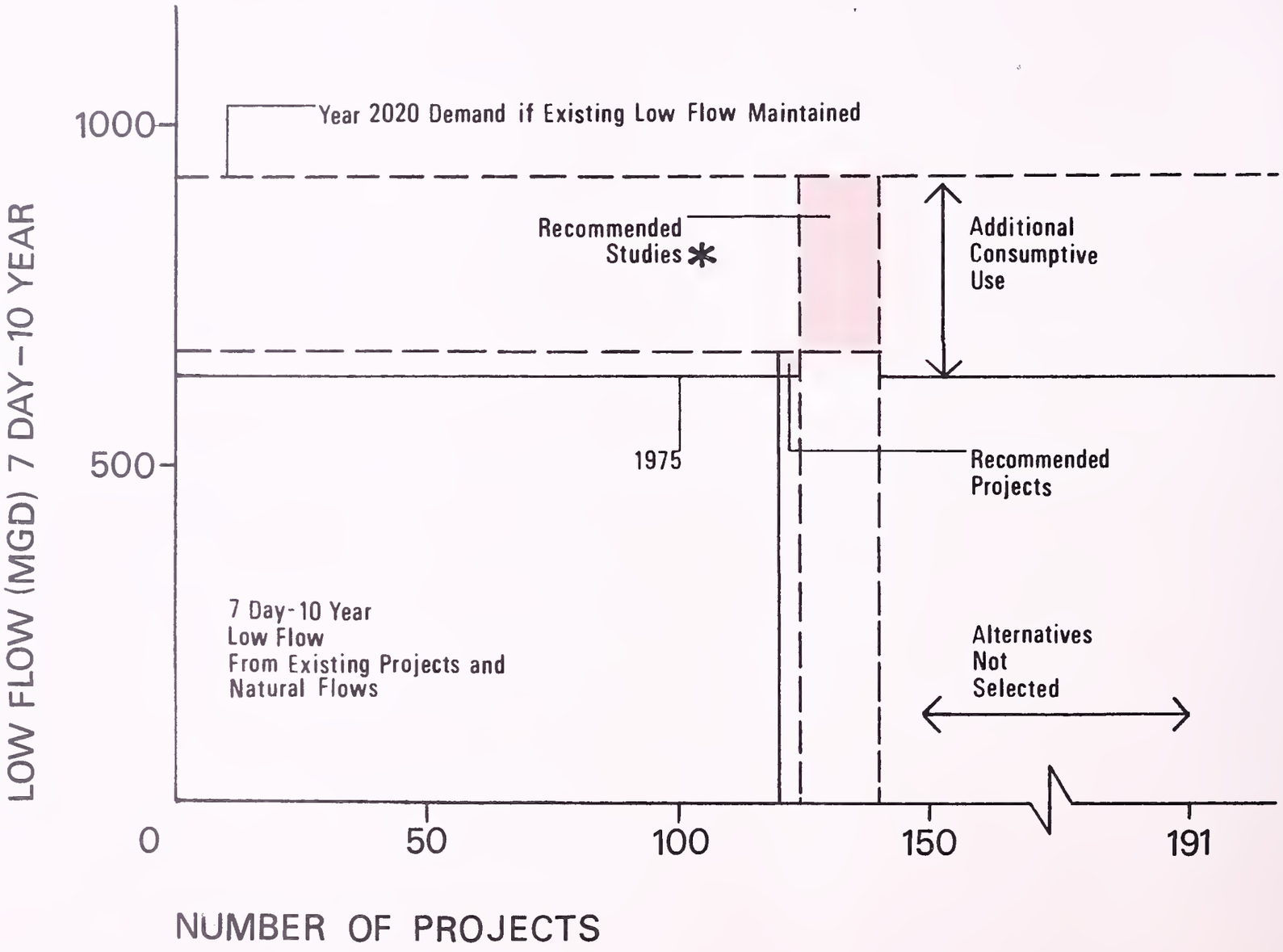
RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
II	701	Grantsville, Md., Public Water Supply	Garrett Co., Md.	DP	Local Government	WS	Yes	Yes	$195,000 - Project Cost
I	702	Crellin, Md., Public Water Supply	Garrett Co., Md.	DP	Local Government	WS	Yes	Yes	$100,000 - Study Cost
I	703	Little Youghiogheny Sanitary District - Deer Park - Oakland - Lochlynn Heights - Mountain Lake	Garrett Co., Md.	DP	State Local	WQC. WS	Yes	Yes	$261,000 - Study Cost 303 (e) for WQC and Local Planning for WS.
I	704	Friendsville, Md., Public Water Supply	Garrett Co., Md.	I	Local Government	WS	Yes	Yes	$880,000 - Project Cost
I	766	Turtle Creek Basin Study	Westmoreland Co. Pa.	DP	Army	NHR, WQC, WS, FDA	Yes	Yes	$ 450,000 (1974) - Study Cost
I	785	Paw Paw Creek Watershed	Marion and Monongalia Cos., West Virginia	PI	USDA	NHR, WS. FDA	Yes	Yes	$1,719,500 (1966) - Project Cost $ 50,000 Study Cost (Subjective)

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	803	Study of Water Quality Improvement and degradation in the Mon Basin	Basinwide	PI	ARC, States	NHR, WQC, WS	—	—	$30,000 Study Cost. Study would include an examination of the effects of large and small impoundments on water quality. The study should tie into the Army Bank Erosion Study and the State WQ Management Plans.
I	888	State determination by stream reach, of minimum low stream flow requirements for aquatic life.	Basinwide	DP	W. Va., Md., Pa.	NHR, WQ, WS	Yes	Yes	No costs available. To be done by the individual states. Low flow standards should be in terms of depth and velocity of flow for minimum maintenance of aquatic life and for maintenance of a satisfactory fishery.
I	1042	E. H. Aldrich Station Expansion Elrama, Pa.	Washington Co., Pa.	I	Western Pa. Water Company	WS	Yes	Yes	Raise withdrawal from 40 - 80 MGD. This is acceptable to the State of Pennsylvania providing total Company withdrawal does not exceed 108 MGD. An application is pending for 140 MGD.

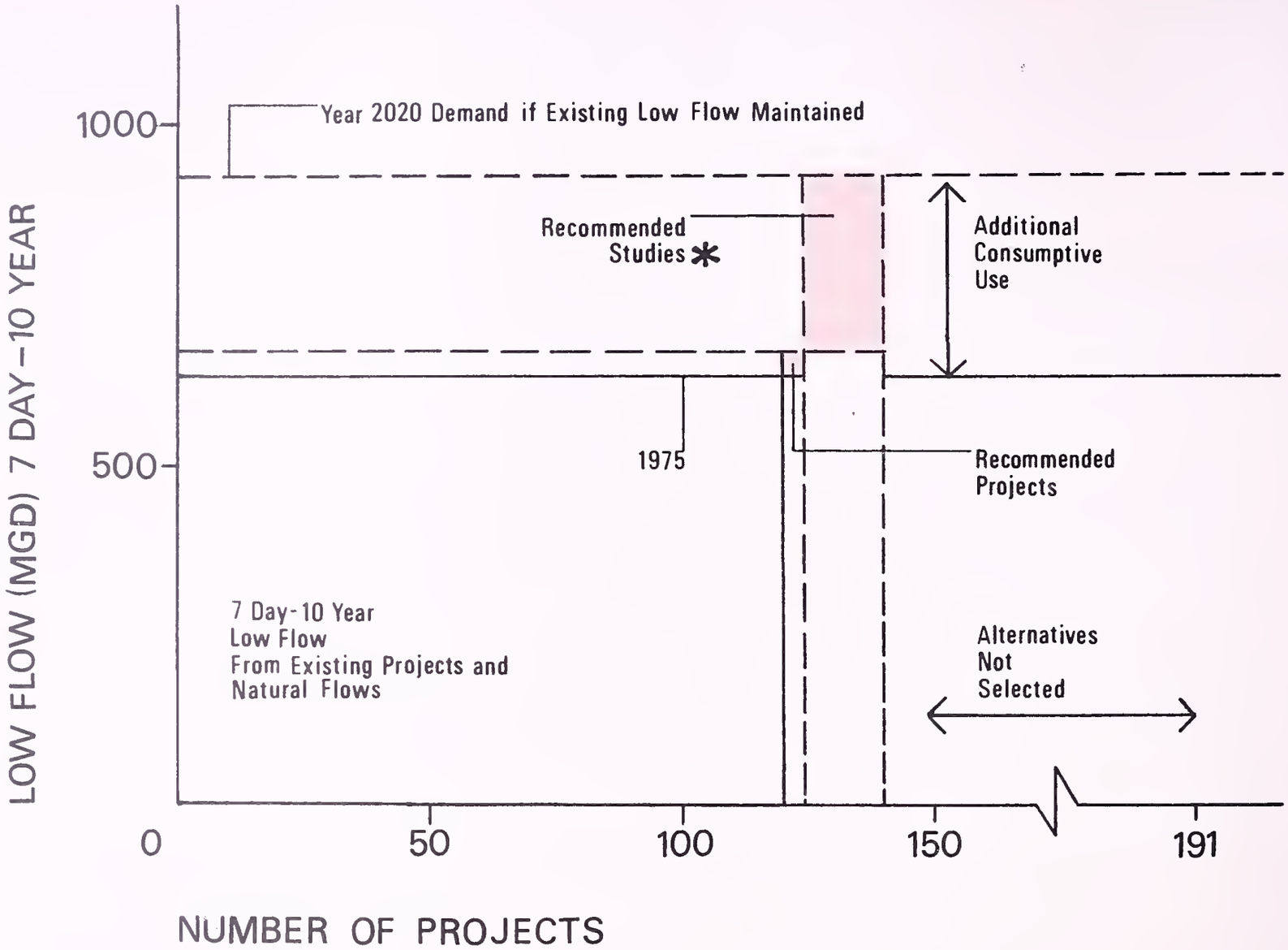
MONONGAHELA-WATER SUPPLY AT PITTSBURGH



* Major portion could come from Rowlesburg.

Recommended Plan for Water Supply

MONONGAHELA-WATER SUPPLY AT PITTSBURGH



* Major portion could come from Rowlesburg.

OHIO
PA.
BEAVER
BEAVER
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ALLEGHENY RIVER
PITTSBURGH
ALLEGHENY
WASHINGTON
WASHINGTON
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MONONGAHELA RIVER
GREENSBURG
WESTMORELAND
SOMERSET
SOMERSET
79°
40°
W. VA.
PA.
GREENE
WAYNESBURG
UNIONTOWN
FAYETTE
PA.
MD.
MONONGALIA
MORGANTOWN
MARION
FAIRMONT
KINGWOOD
GARRETT
OAKLAND
HARRISON
PRESTON
GRAFTON
CLARKSBURG
TAYLOR
BARBOUR
PHILIPPI
M.D.
W. VA.
PARSONS
TUCKER
WESTON
LEWIS
BUCKHANNON
ELKINS
RANDOLPH
UPSHUR
POCAHONTAS

WATER SUPPLY

IMPLEMENTATION

MUNICIPAL-GROUND

MUNICIPAL-SURFACE

RECOMMENDED PROJECTS & PROGRAMS

Map ID numbers refer to text

MONONGAHELA RIVER BASIN

SCALE

10 0 10 20 Kilometers

10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION

CINCINNATI, OHIO

1974

Power

Based on preliminary Federal Power Commission (FPC) data, the total power demand in 1971 for Power Supply Area (PSA) 7 amounted to 34.4 billion kwh, with an installed capacity of 7,325 MW. The corresponding peaking demand was 5,604 MW yielding a normal operating load factor of 70 percent. It is estimated that peak demands of the PSA7 market will amount to 9,600 MW in 1980; 24,100 megawatts in 2000; and will reach 59,000 by 2030. This demand was based on the current rate of increase of approximately six percent to four percent by the year 2000. A reserve capacity margin of 20 percent is included for scheduled maintenance and contingencies.

Because of the many variables it was not possible to develop a specific set of power-related goals for the Monongahela River Basin. However, it should be noted that the Monongahela Basin in 1971 already provided approximately 60 percent (4,350 MW) of the installed capacity in PSA7, while in terms of geographic area PSA7 is four times as large as the Monongahela Basin.

The peaking power demand for PSA7 can be met in part by installation of pumped storage at the Rowlesburg and Davis Projects, with respective installed capacities of 525 and 1,000 MW. Because the energy required to pump to the upper reservoir in off-peak hours will exceed the energy output for peak-hour use by an approximate three to two ratio, other facilities will have to be used to provide the off peak hour pumping energy. With the addition of the installed capacities of these two projects, there would remain a 15,000 MW deficit for PSA7 in the year 2000. The remaining demand might be met by other pumped storage sites within or without the basin, by other types of power production, or by curtailing the demand.

For the Davis Power Project, there are potential alternative uses of the water and land resources, including environmental considerations which must be balanced prior to inclusion of the project in the recommended plan. Significant factors for consideration of decision makers are displayed on Page 135. The Rowlesburg Lake Project is recommended for detailed planning.

No specific recommendations were made for the total power demand of PSA7. However, it would be possible to operate Rowlesburg and Davis in a manner that would provide some base power. Also, a feasibility study has been proposed to explore the potential 40 MW of base power at the existing Tygart Lake.

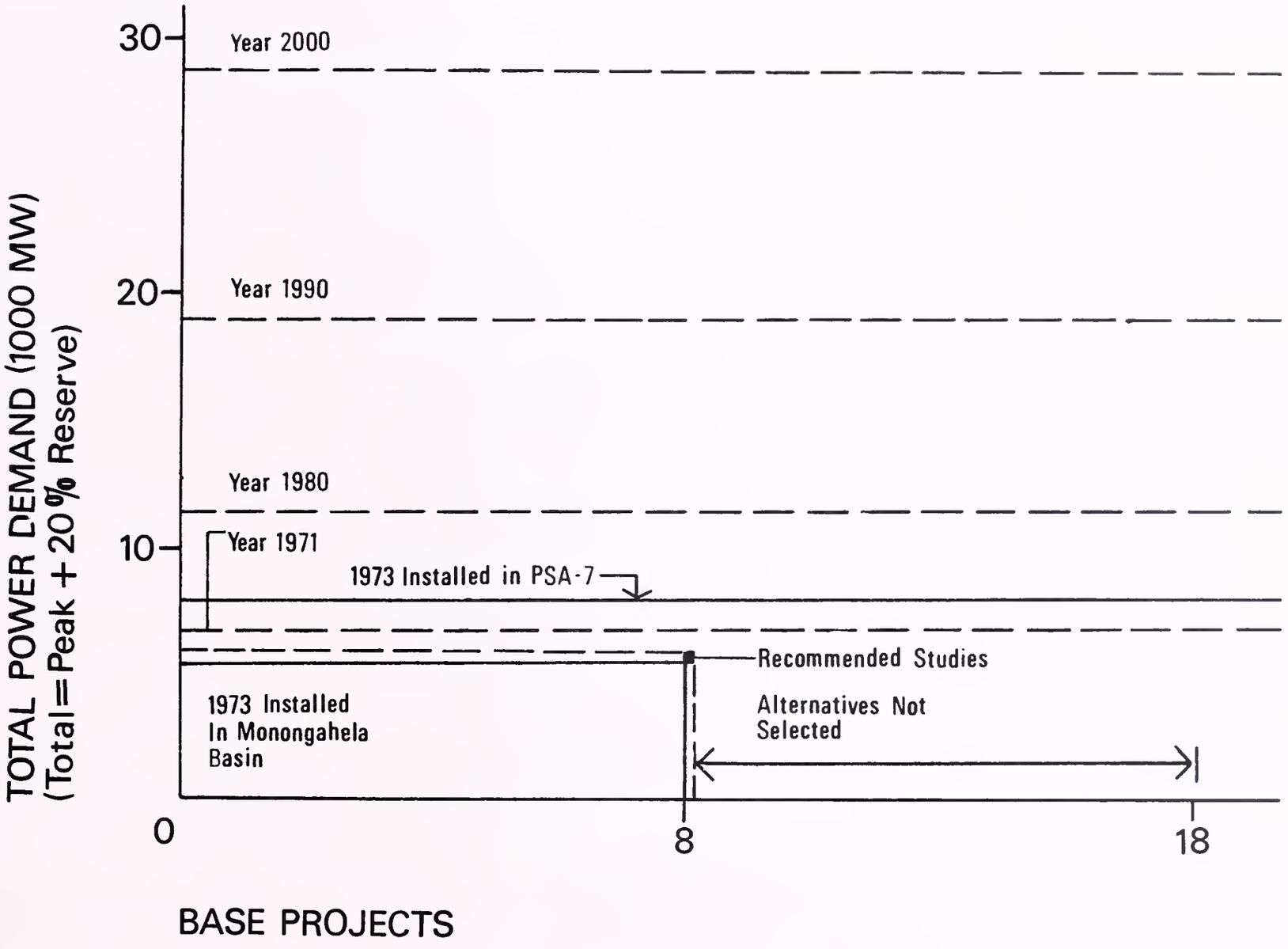
Additional alternatives considered, but not selected, included 11 pumped storage projects and nine conventional hydroelectric projects. While no specific siting information was available for fossil fuel or nuclear plants, cooling water requirements were estimated and discussed under the water supply section.

Displays following this narrative include a table and map for the recommended plan, and charts comparing the demand with the recommended plan.

RECOMMENDED PLAN

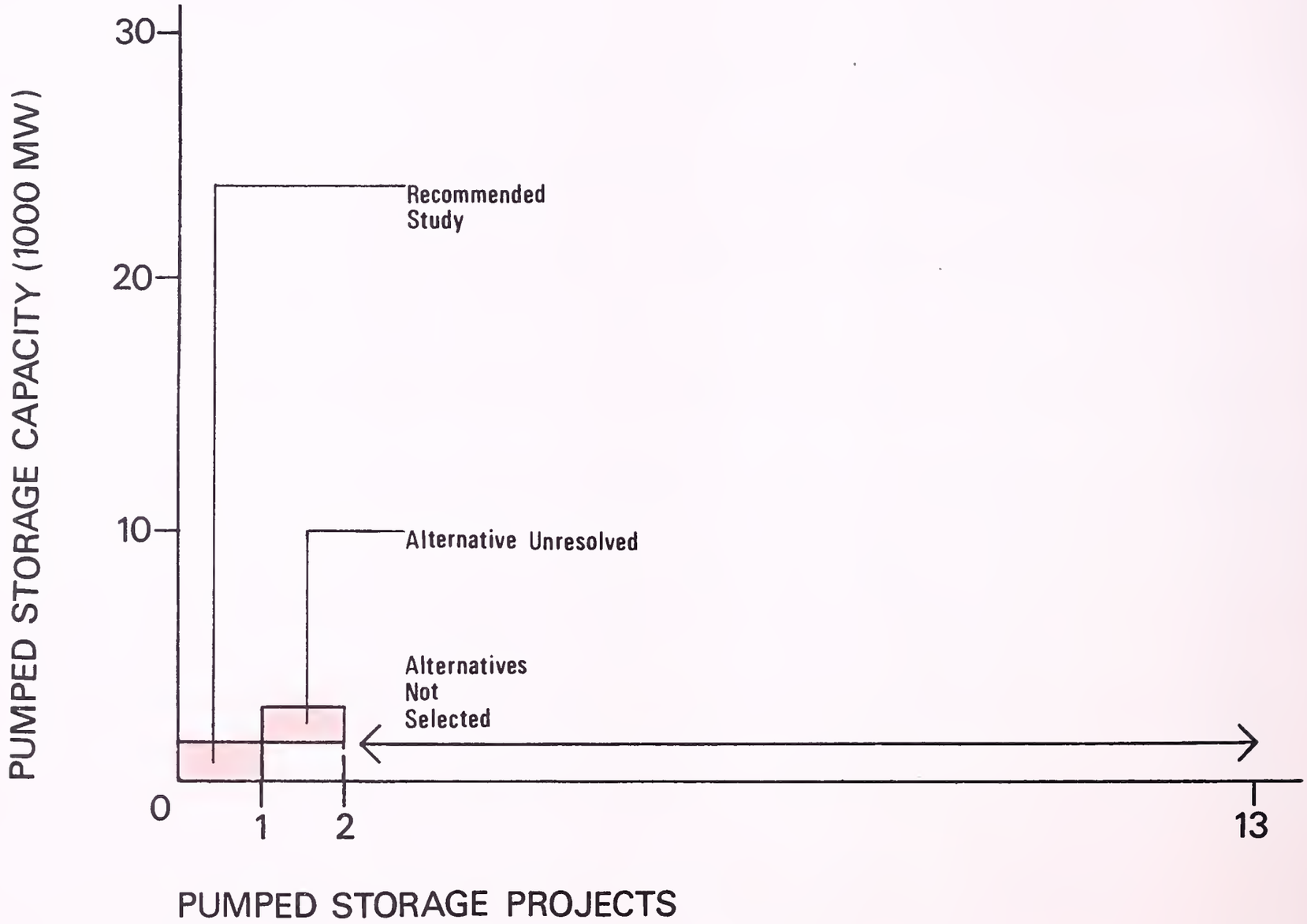
PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	112	Rowlesburg Lake	Preston & Tucker Co., W. Va.	DP	Army	NHR,WS, FDA,P,WQC	Yes	No	At the request of West Virginia, the Corps is in the process of examining various alternatives to the project. Flow regulation for Cheat Wild and Scenic River should be considered. A re-evaluation of the need and feasibility of storage for low flow augmentation should be made. Water supply was not a part of the original authorization.
I	1040	Tygart Lake Study for the feasibility of Power Production	Taylor & Barbour Counties, W. Va.	PI	Army	P	—	—	$ 25,000 - Part of Monongahela Level C.

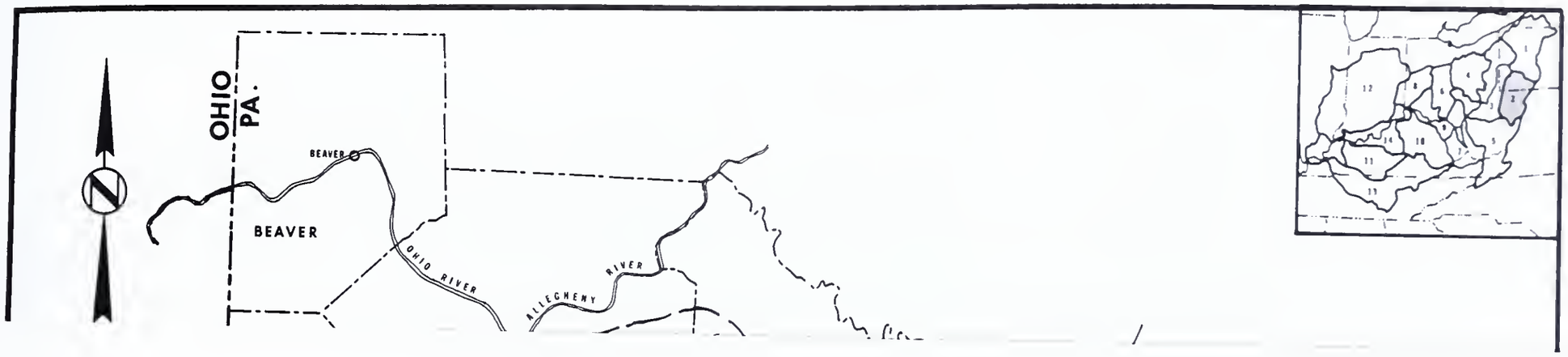
POWER SUPPLY AREA 7*



* PSA-7 is 4 times the geographic area of the Monongahela Basin.

MONONGAHELA BASIN




OHIO
PA.
BEAVER
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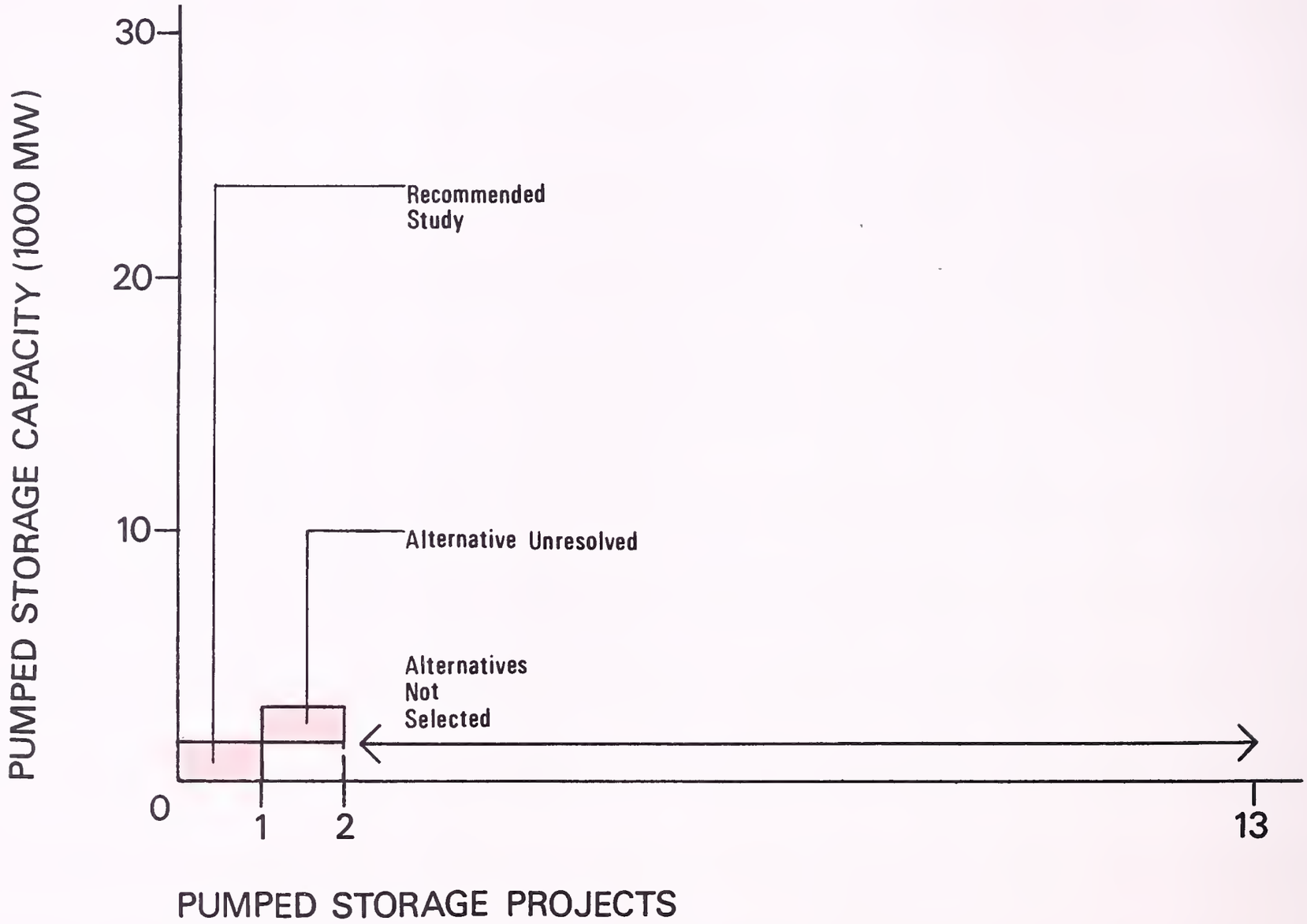
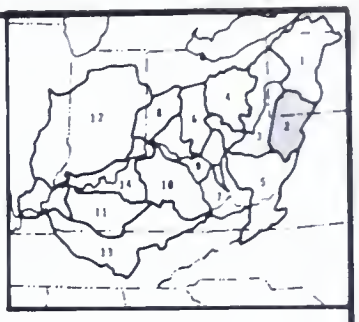
RIVER

MONONGAHELA BASIN





OHIO
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ALLEGHENY RIVER
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GREENSBURG
WESTMORELAND
MONONGAHELA RIVER
WASHINGTON
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UNIONTOWN
FAYETTE
GREENE
PA.
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MONONGALIA
MORGANTOWN
MARION
FAIRMONT
KINGWOOD
GARRETT
OAKLAND
HARRISON
PRESTON
GRAFTON
112
CLARKSBURG
TAYLOR
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BARBOUR
PHILIPPI
PARSONS
TUCKER
WESTON
LEWIS
BUCKHANNON
ELKINS
RANDOLPH
UPSHUR
POCAHONTAS

POWER

STUDIES IMPLEMENTATION

THERMAL

◇ ◇ HYDRO

RECOMMENDED
PROJECTS & PROGRAMS

Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE

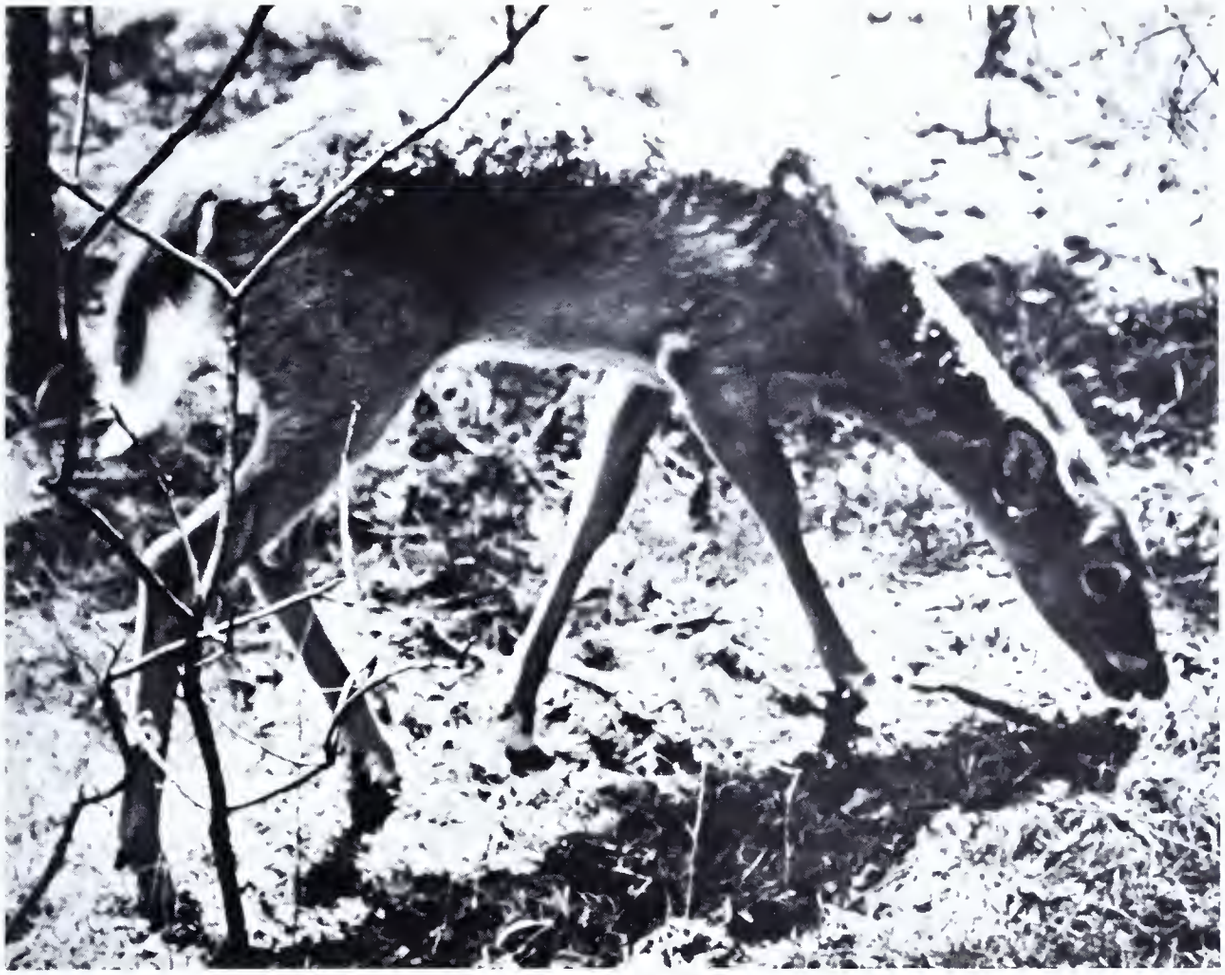
10 0 10 20 Kilometers

10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION

CINCINNATI, OHIO 1974

The plan includes a mixture
of active and passive forms of recreation.



Natural, Historic, and Recreation

Information used to define Natural, Historic, and Recreation needs and problems came primarily from the 1970-1975 State Comprehensive Outdoor Recreation Plans (SCORP) of Maryland and West Virginia and from the draft State Water Plan of Pennsylvania. Differences in standards and methodologies made interstate comparisons of recreation needs difficult. These differences can cause wide variations in how the recreation demand/supply relationship is defined. Therefore, although an approximate recreation demand for the entire basin is displayed, an interstate and Federal agency task force to identify priority areas for recreation demand and alternative solutions for meeting this demand is recommended.

As for individual areas of need in the basin, by 1990, Pennsylvania is projected to have a deficit of 1,800 boating acres. Data from the Pennsylvania Fish Commission, the only information available on fishable waters, showed a deficit of 3,700 acres in 1970. West Virginia projected a deficit of 7,041 boatable acres and 1,500 fishing acres for 1985. Maryland estimates a surplus of 2,900 boating acres and 5,500 fishing acres for 1990.

Demand for canoeing and whitewater was not computed separately from general boating in the SCORP studies or the State Water Plan. The demand is especially difficult to define due to the great distances enthusiasts travel, and the extraordinary growth trend of these sports. In the "Monongahela-Youghiogheny River Basin Outdoor Recreation Survey Planning Guide," the Bureau of Outdoor Recreation (BOR) cited a need for canoeing in year 2000 of 2,600-2,800 miles of stream. Of the 11,000 miles of streams and rivers in the basin, 500 miles are rated as canoeable. Beside the need to examine alternatives, this relationship points to the particular need to preserve

and/or enhance these remaining canoeable waters. The Commission has listed high quality canoeing, whitewater, and fishing streams for future reference in planning.

Because of lack of inventory data, it was not possible to provide a true demand/supply relationship for picnicking and camping in Maryland. Sufficient data was available in West Virginia and Pennsylvania.

West Virginia's SCORP identified a 1,021 site deficit for picnicking facilities and a 1,753 site deficit for camping facilities in 1985. Pennsylvania, in its draft State Water Plan, identified a 2,300-acre surplus for picnicking facilities and a 600-acre deficit in camping facilities. The Monongahela plan does not address picnicking and camping directly in the proposed projects and programs. While some demand will be met through planning on the project level, it was considered that providing for the total demand was outside of the scope of the Monongahela Study.

There is a small need for swimming acreage in the Monongahela Basin. Two alternatives seem viable for meeting the need - build more swimming pools or develop existing lakes or river resources. No specific projects or programs were recommended in the plan formulation to meet this need. However, some of the need could be met by making provision during project analysis.

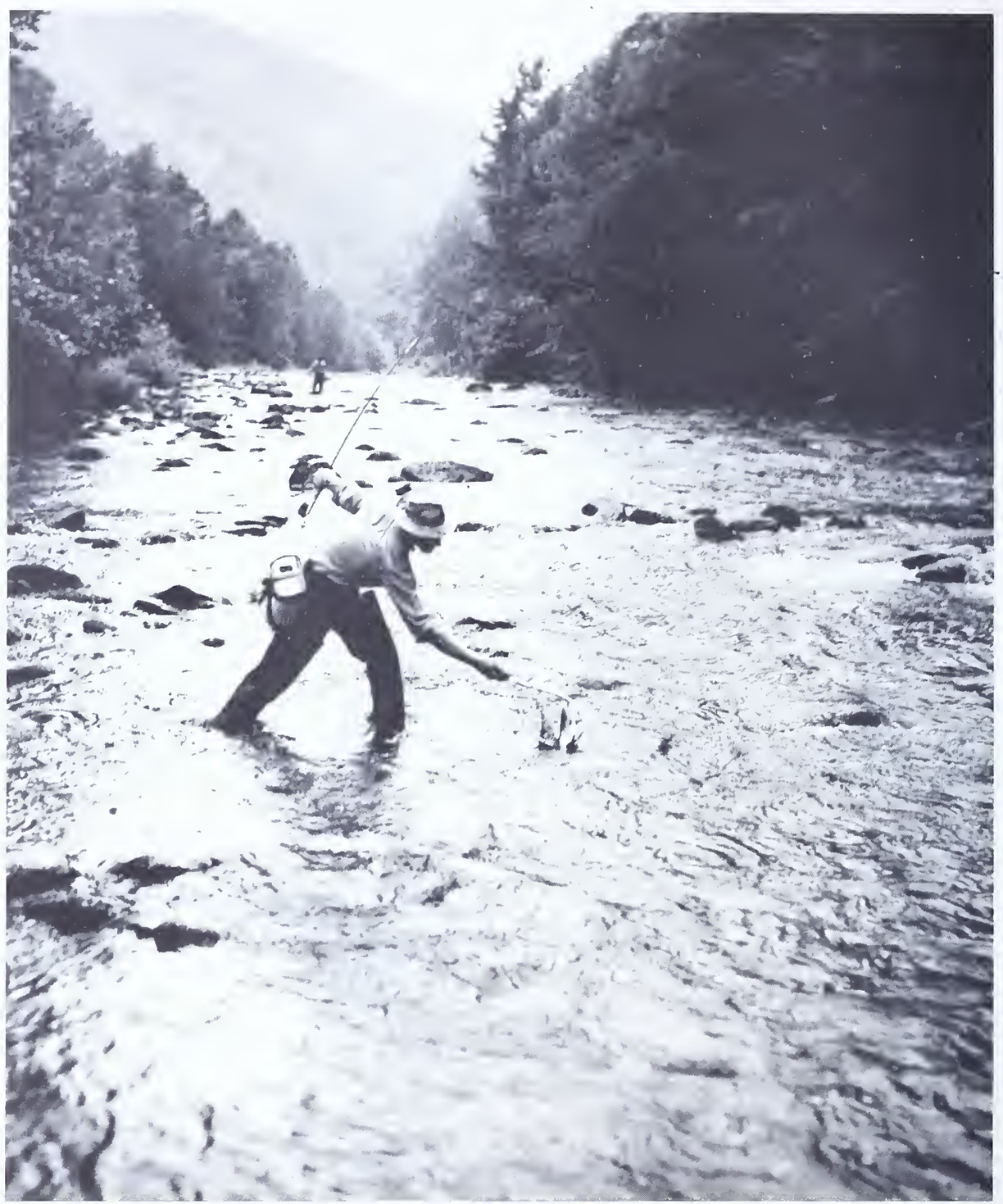


Photo by U.S. Forest Service.

Hunting needs, as defined by the Ohio River Basin Comprehensive Survey, Appendix G, are astronomical — 2,400,000 acres by approximately 1990. Again, the plan formulation did not address these needs directly. As with camping and picnicking, some demand will be met through planning in the project level, but providing for the total demand is outside of the scope of this study.

In addition to the recreation requirements, prime areas of natural and historic consideration were identified. Notable among these are Sinks of Gandy, Dolly Sods Natural Area (8,010 acres outside of the wilderness area), Canaan Valley Natural Area, and the Casselman, Cheat, and Youghiogheny Wild and Scenic Rivers. For the Canaan Valley Natural Area, the Davis Project poses an alternative use of the resources. Power and environmental considerations must be balanced prior to inclusion of these two projects in the recommended plan. Also, prime fishing and canoeing streams were identified for consideration in future planning of projects which might affect these resources. These streams have been adopted into the Baseline.

If all potential water acres given implementation status in the recommended plan were to be constructed, 3,080 acres of recreational water would be added to West Virginia. With the addition of this acreage, there would be an approximate deficit of 3,960 boating acres and a surplus of 1,580 fishable acres in 1985.

This demand/supply balance would be modified further by the addition of the 9,675 acres of recreational water proposed for detailed planning in the recommended plan, and by Burnsville Lake, a Corps of Engineers project just outside of the basin. There were no projects with recreational benefits proposed for implementation in Pennsylvania, however, two PL 566 projects having detailed planning status are in the recommended plan. One project would have 120 acres of recreational water. A portion of this acreage would be in Maryland, and it is the only new acreage proposed for that state. Acreage of recreational water for the other project in Pennsylvania is undetermined at this time. To compensate for the remaining deficits in Pennsylvania, a study of the Monongahela Main Stem's potential for providing increased recreational usage has been proposed in the plan. In the past, poor water quality has limited recreational use of the Monongahela River, but improving water quality has been documented recently by EPA through a fish population study. This improving water quality indicates a need to examine the recreational potential of this resource.

The bulk of the projects in the plan which provide active recreational opportunities (boating, fishing, etc.) were not proposed specifically to meet recreational needs by the Plan Formulation Committee. Instead, these projects are multipurpose and were placed in the plan by virtue of their capacity to solve other needs and problems such as flood damage or water supply. Because of the complexity of the Natural, Historic, and Recreation Plan Formulation, work groups were formed to give special attention to assuring that all priority needs and problems were considered. Most of their attention was focused on unpreserved areas of natural or historical significance.

Historic areas in the plan formulation are those included in the National Park Service (NPS) registry of historic places. When the NPS study of potential natural areas in the Appalachian Plateau is complete, those areas identified will be considered for addition to the plan. The study effort did not define potential archeological sites. There was a lack of such data, seemingly due to lack of funding for an inventory, confidentiality of information, and the numbers and difficulty of determining such sites.

Displays following this narrative include a table and map of the recommended plan, tables and maps of high quality streams and natural and historic areas, and charts comparing the boating and fishing demand with the recommended plan. The origin of most of the demand follows the urban areas shown on the map on page 145.

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	87	Tygart Lake Master Plan Update	Taylor & Barbour Counties, W. Va.	DP	W. Va./ Army	NHR	Yes	Yes	$ 72,000 Study Cost - Abandoned park downstream of dam should be considered.
I	91	Stonewall Jackson Lake & State Park	West Fork River above Weston, W. Va.	I	Army	NHR, WQC, WS, FDA	Yes	Yes	$87,500,000 (1974) - Project Cost. Include: Water Quality Storage. Require Mine Drainage Abatement. In a coal bearing formation, buffer should be maintained between the lake and any active mining. A court hearing is presently being scheduled. Principal complaints have been the lack of a detailed consideration of upstream reservoirs and disagreements as to B/C calculations.
I	112	Rowlesburg Lake	Preston & Tucker Co., W. Va.	DP	Army	NHR,WS, FDA,P,WQC	Yes	No	At the request of West Virginia, the Corps is in the process of examining various alternatives to the project. Flow regulation for Cheat Wild & Scenic River should be considered. A re-evaluation of the need and feasibility of storage for low flow augmentation should be made. Water supply was not a part of the original authorization.
II	346	Three Forks Creek Watershed	Preston, Taylor & Monongalia Co., W. Va.	DP	USDA	NHR, WQC, WS, FDA	Yes	Yes	$2,515,000 (1966) - Project Cost $ 350,000 - Study Cost (National Average)
II	348	Sandy Creek Watershed	Preston, Taylor & Barbour Co., W. Va.	DP	USDA	NHR, WS, FDA	Yes	Yes	$2,107,200 (1966) - Project Cost. $ 350,000 - Study Cost (National Average)
I	349	Leading Creek Watershed	Randolph Co., W. Va.	DP	USDA	NHR, WS, FDA	Yes	Yes	$5,933,900 (1970) - Project Cost $ 350,000 - Study Cost (National Average)
II	353	French Creek Watershed	Upshur Co., W. Va.	DP	USDA	NHR, FDA	Yes	Yes	$1,762,000 (1966) - Project Cost $ 350,000 - Study Cost (National Average)

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
II	356	Mill Creek Watershed	Barbour Co.	DP	USDA	NHR, FDA	Yes	Yes	$1,563,000 (1970) - Project Cost $ 350,000 - Study Cost (National Average)
I	382	Lost Creek Watershed	Harrison & Lewis Cos., W. Va.	PI	USDA	NHR, WS FDA	–	–	$1,054,000 (1970) - Project Cost $ 50,000 - Study Cost (National Average)
I	383	Hackers Creek Watershed	Harrison, Lewis & Upshur Cos., W. Va.	DP	USDA	NHR, WQC, WS, FDA	Yes	Yes	$2,652,000 (1970) - Project Cost $ 350,000 - Study Cost (National Average) US Fish & Wildlife Service has provided guidlines for the channel modifications. W. Va. DNR has given conditional agreement to the project.
I	389	Upper Little Ten Mile Creek Watershed	Harrison Co., W. Va.	PI	USDA	NHR, WS FDA	–	–	$4,750,000 (1966) - Project Cost $ 50,000 - Study Cost
I	394	Simpson Creek Watershed	Harrison, Taylor & Barbour, W. Va.	DP	USDA	NHR, WQC, WS, FDA	Yes	Yes	$2,618,700 (1966) - Project Cost $ 350,000 - Study Cost (National Average) The watershed has mine drainage problems.

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	688	Elk Creek Watershed	Barbour,Harrison & Upshur Counties, W.Va.	I	USDA	NHR, WQC, FDA	Yes	Yes	$20,707,200 (1972) - Concurrent drainage abatement is now underway by the state of West Virginia.
I	697	Upper Casselman River Watershed PL 566	Somerset Co.,Pa. Garrett Co.,Md.	DP	USDA	NHR,FDA, WQC,WS	Yes	Yes	$4,450,000 (1966) - Project Costs $ 350,000 - Study Costs (National Average) Requires mine drainage abatement.
I	705	Youghiogheny Wild and Scenic River Study (PL 90-542)	Maryland and Pennsylvania	I	USDI, Pa., Md.	NHR	Yes	Yes	$ 100,000 (1972) - Study Costs In a possible coal bearing formation, buffer should be maintained between the River and any active mining.
I	739	Cheat Wild and Scenic River Study (PL 90-542)	Preston & Tucker Cos., W. Va.	DP	USDI/ W. Va.	NHR	Yes	Yes	The River offers a wide range of boating opportunities. In the upstream portions, the run is ideal for canoe camping. Two sections, Manheim to the Railroad Bridge and Albright to Jenkins Bridge, offer outstanding Kayaking and Rafting. Abandoned railroad right-of-way should be considered for trail development.
I	755	Dolly Sods Natural Area	Tucker County, W. Va.	DP	USDA/ W. Va.	NHR	No	Yes	$ 600,000 (1974) land acquisition costs plus management cost. This area is 8,000 acres outside of the designated wilderness area and USFS Proclamation boundary. 600 acres would be affected by the Davis Pumped Storage Reservoir and should be considered in project management.
I	756	Sinks of Gandy Natural Area	Randolph County, W. Va.	I	USDA/ W. Va.	NHR	No	Yes	$ 30,000 (1974) land acquisition costs plus management costs.

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	760	Shavers Fork Wild & Scenic River Study	Tucker and Counties, W. Va.	DP	USDI/ W. Va.	NHR	Yes	Yes	US Legislative action (95th Congress) HB 1975, is presently underway for a study of Shavers Fork from Parsons to Spruce, West Virginia. $ 100,000 (1974)
I	766	Turtle Creek Basin Study	Westmoreland Co., Pa.	DP	Army	NHR,WQC, WS, FDA	Yes	Yes	$ 450,000 (1974) - Study Cost
I	783	Little Creek Watershed	Marion County, W.Va.	PI	USDA	NHR,FDA	–	–	$ 538,500 (1970) - Project Cost $ 50,000 - Study Cost
I	785	Paw Paw Creek Watershed	Marion & Monongalia Cos., W.Va.	PI	USDA	NHR, WS, FDA	Yes	Yes	$1,719,500 (1966) - Project Cost $ 50,000 - Study Cost (Subjective)
II	791	Casselman Wild & Scenic River Study (PL 90-542)	Headwaters to Confluence (Somerset, Pa., Garrett, Md.)	PI	USDI, PA & MA.	NHR	Yes	Yes	$ 10,000 - (Study Costs) in a possible coal bearing formulation. A buffer should be maintained between the river and any active mining.
I	792	Acquisition of Strip Mined Lands as Recreation and Ecological Areas (Demonstration Project)	Fayette,Somerset & Westmoreland Co., Pa.	PI	Pa., BOR, ARC	NHR	–	–	$ 15,000 (Study Costs)
I	794	Deep Creek Lake Management and Development Agreement	Garrett, Md.	DP	Md., Penelec Corp.	NHR, WQC	Yes	Yes	Covered by Exhibit R of Penelec Application to FPC (Zoning changes, Buffer zones, Wildlife Refuges, Sanitation Facilities, Recreation Facilities). Penelec Costs $250,000 (1972). State Costs - $100,000

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
II	795	Meadow Mountain Scenic Highway	Garrett, Md.	PI	Md.	NHR	—	—	No costs available. Opposed by Wildlife Administration of Maryland.
II	796	Piney Mountain State Park	Garrett, Md.	DP	Md.	NHR	Yes	Yes	Administrative costs only
I	797	Protective Measures for Cranesville Swamp	Garrett, Md.	DP	Md.,W. Va, Univ. & Nature Conservancy	NHR	No	Yes	$25,000 Study Cost
I	800	Recreation opportunity should be considered at all federally financed lakes. The States recommend that the U.S. Congress enact legislation and provide funding for public access for all PL 566 lakes over 20 surface acres.	Nationwide	I	Congress	NHR	Yes	Yes	
I	802	Study of the Monongahela River's Recreational potential from Fairmont, W. Va. to mouth at Pittsburgh.	Upper and Lower Main Stem	DP	W. Va., Pa., Private Industry	NHR	Yes	Yes	$ 100,000 Study Cost. In a possible coal bearing formation. A buffer between the river and active mining should be examined.
I	803	Study of Water Quality Improvement and degradation in the Mon Basin.	Basinwide	PI	ARC, States	NHR, WQC, WS	—	—	$ 30,000 Study Costs. Study would include an examination of the effects of large and small impoundments on water quality. The study should tie into the Army Bank Erosion Study and the State WQ Management Plans.

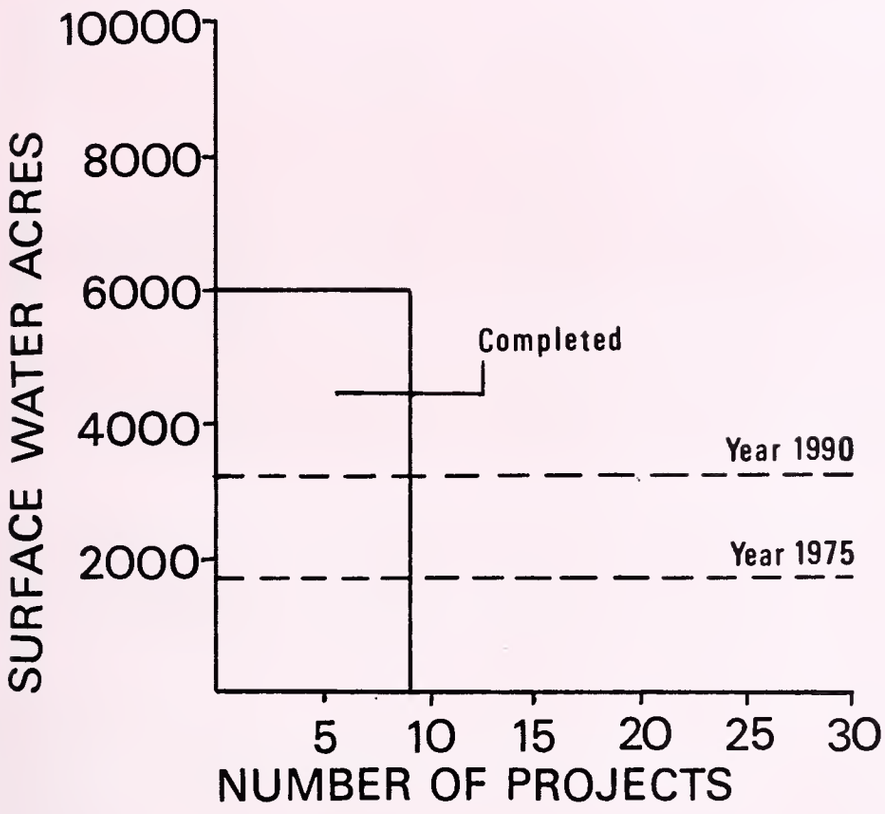
RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	804	Task Force to examine interstate recreation demand for the Mon Basin.	Basinwide	PI	W.Va., Pa., Md., USDI	NHR	—	—	Cost would be from operating budgets. The task force would identify priority areas for recreation demand and alternative solutions for meeting this demand. This would be in consideration of total State and interstate demand.
I	812	Ski Facilities & Concession Bldg. Laurel Mountain State Park	Westmoreland, Pa.	I	Pa.	NHR	Yes	Yes	$ 650,000 (Preliminary)
I	813	Swimming Pool for Handicapped-Laurel Hill State Park	Somerset, Pa.	I	Pa.	NHR	Yes	Yes	$ 220,000 (Preliminary)
I	814	Park Improvement & Sanitary Facilities - Kooser & Laurel Hill State Park	Somerset, Pa.	I	Pa.	NHR, WQC	Yes	Yes	$4,000,000 (Preliminary)
I	815	Water Distribution and Sewer-Laurel Hill State Park	Sometset, Pa.	I	Pa.	NHR, WQC	Yes	Yes	$1,071,000
I	816	Trail Related Facilities-Laurel Ridge State Park	Westmoreland, Somerset, Fayette, Cambria, Pa.	I	Pa.	NHR	Yes	Yes	$ 675,000
I	817	Day-Use Development Ohio Pyle State Park	Somerset, Fayette, Pa.	I	Pa.	NHR	Yes	Yes	$1,000,000 (Preliminary)
I	818	Elizabeth Twp. Access Area - Monongahela River	Allegheny, Pa.	I	Pa.	NHR	Yes	Yes	$ 45,000 (Subjective)
I	1049	Mt. Davis Facility Improvement	Somerset. Pa.	I	Pa.	NHR	Yes	Yes	$ 150,000

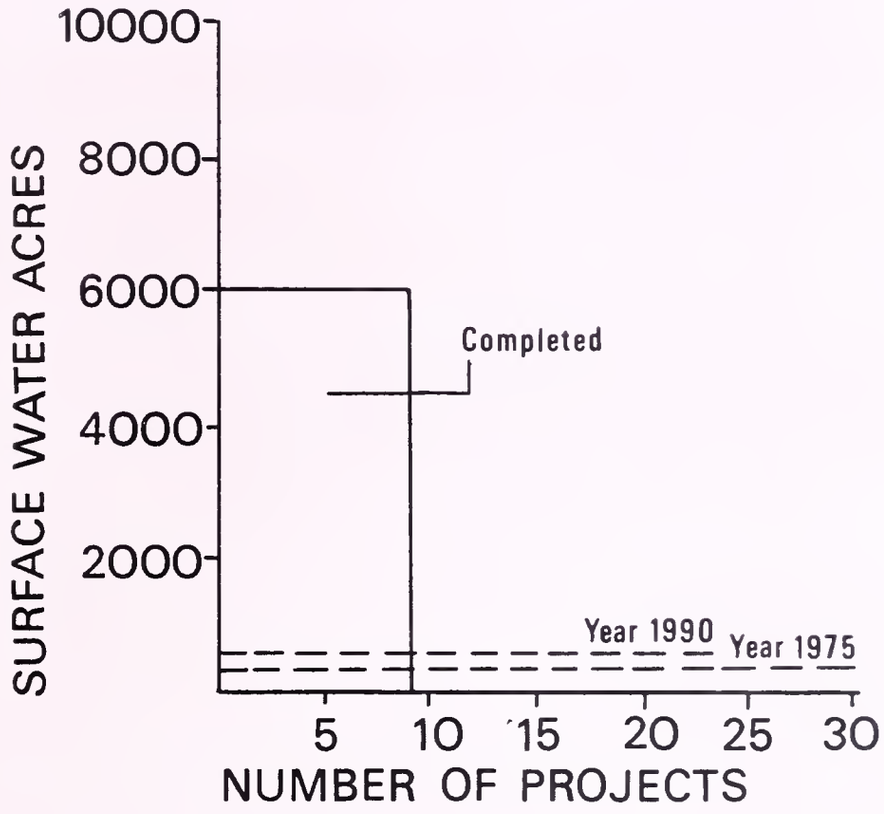
RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	888	State determination by stream reach, of minimum low stream flow requirements for aquatic life.	Basinwide	DP	W. Va., Md., Pa.	NHR, WQ, WS	Yes	Yes	No costs available. To be done by the individual states. Low flow standards should be in terms of depth and velocity of flow for minimum maintenance of aquatic life and for maintenance of a satisfactory fishery.
I	1037	Master Plan update at Youghiogheny Reservoir	Somerset, Pa. Garrett, Md.	DP	Army	NHR	Yes	Yes	$ 75,000
I & II	1041	Middle Fork River Wild & Scenic River	Barbour, Upshur & Randolph Counties	PI	USDI/ W. Va.	NHR	Yes	Yes	$ 10,000 (Study Costs) At present the river has mine drainage problems. The study would be Priority II under PL 90-542, and Priority I for the State Wild & Scenic Rivers designation.

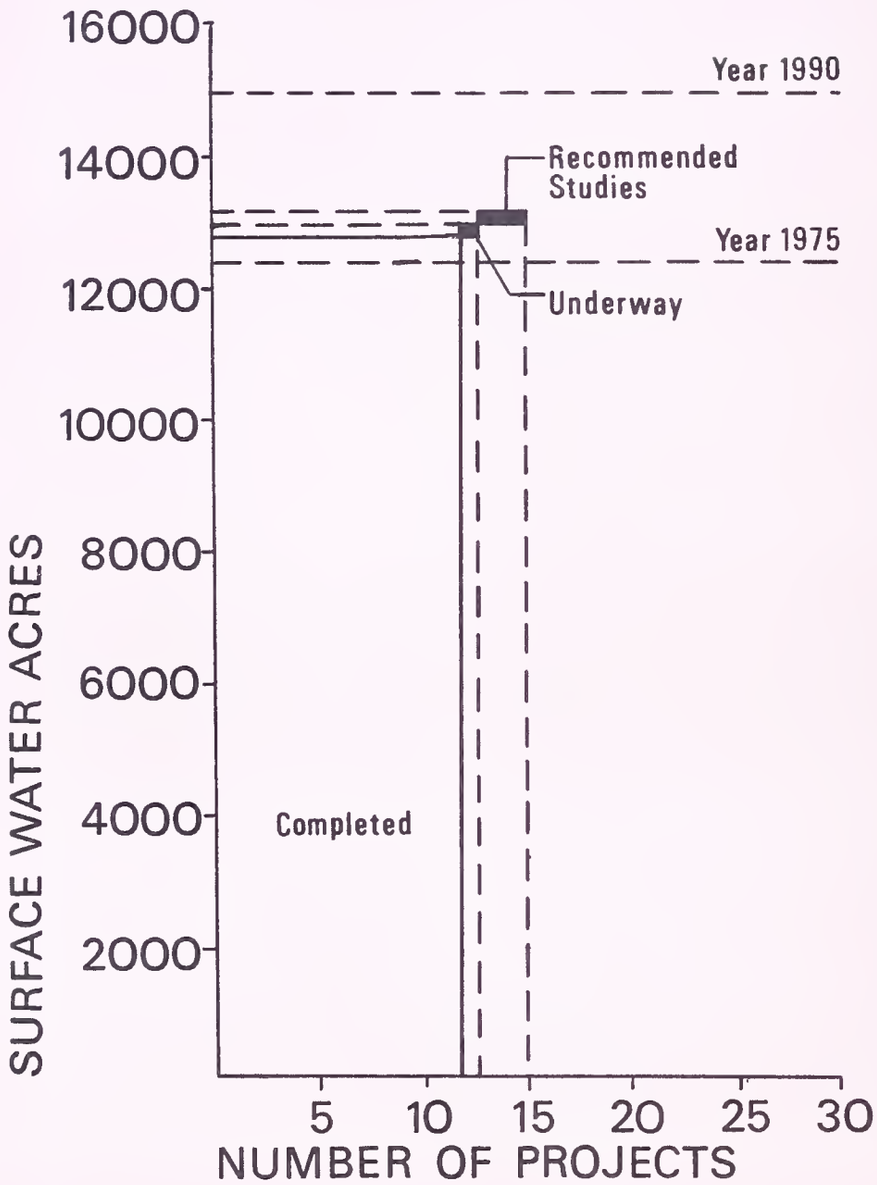
BOATING DEMAND
IN MARYLAND (1990)



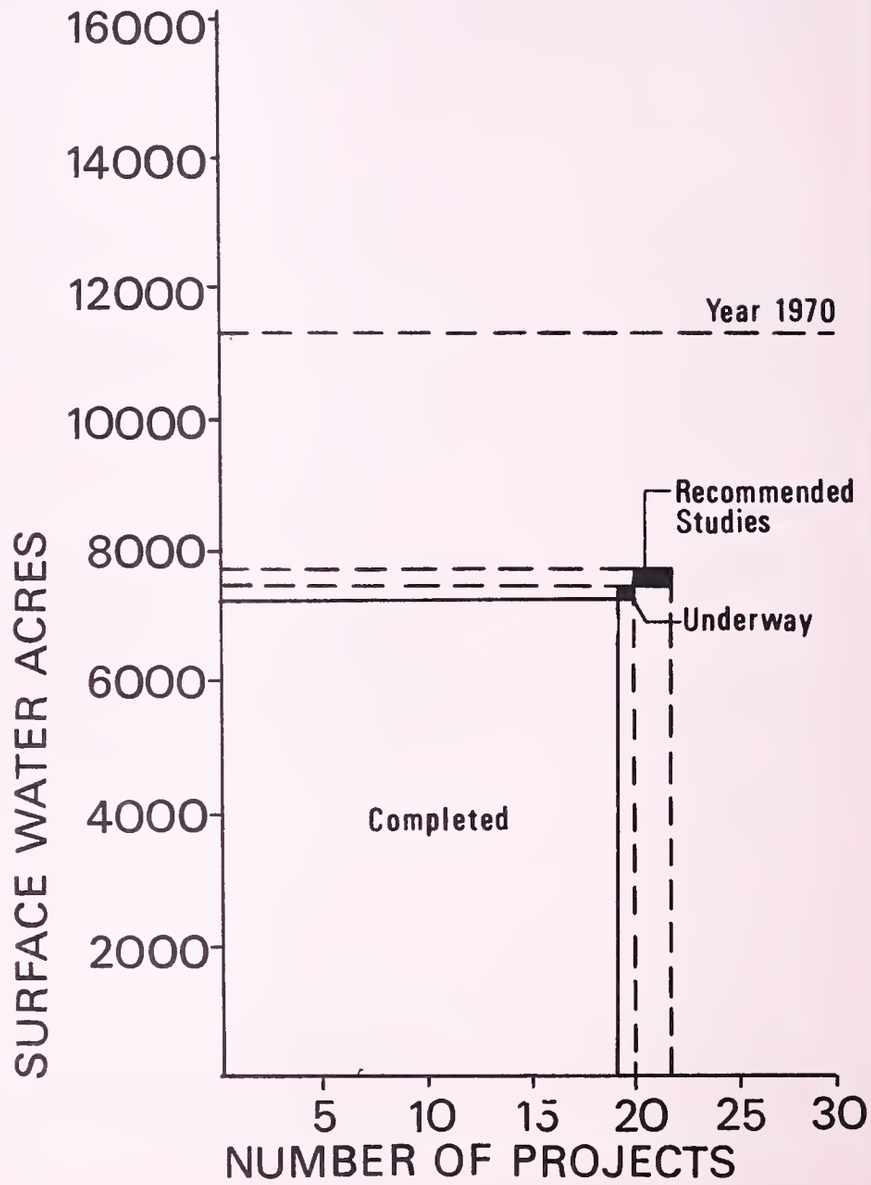
FISHING DEMAND
IN MARYLAND (1990)



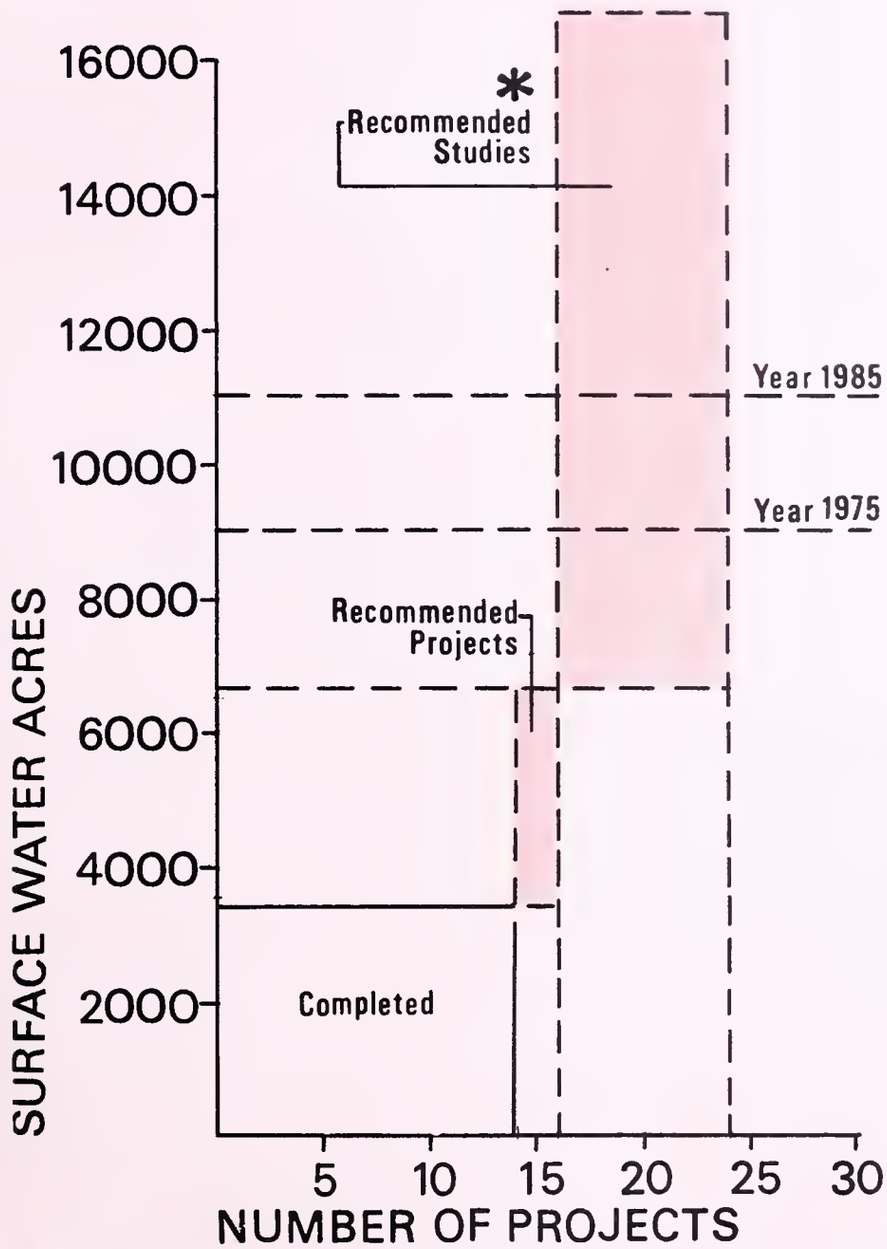
BOATING DEMAND
IN PENNSYLVANIA (1990)



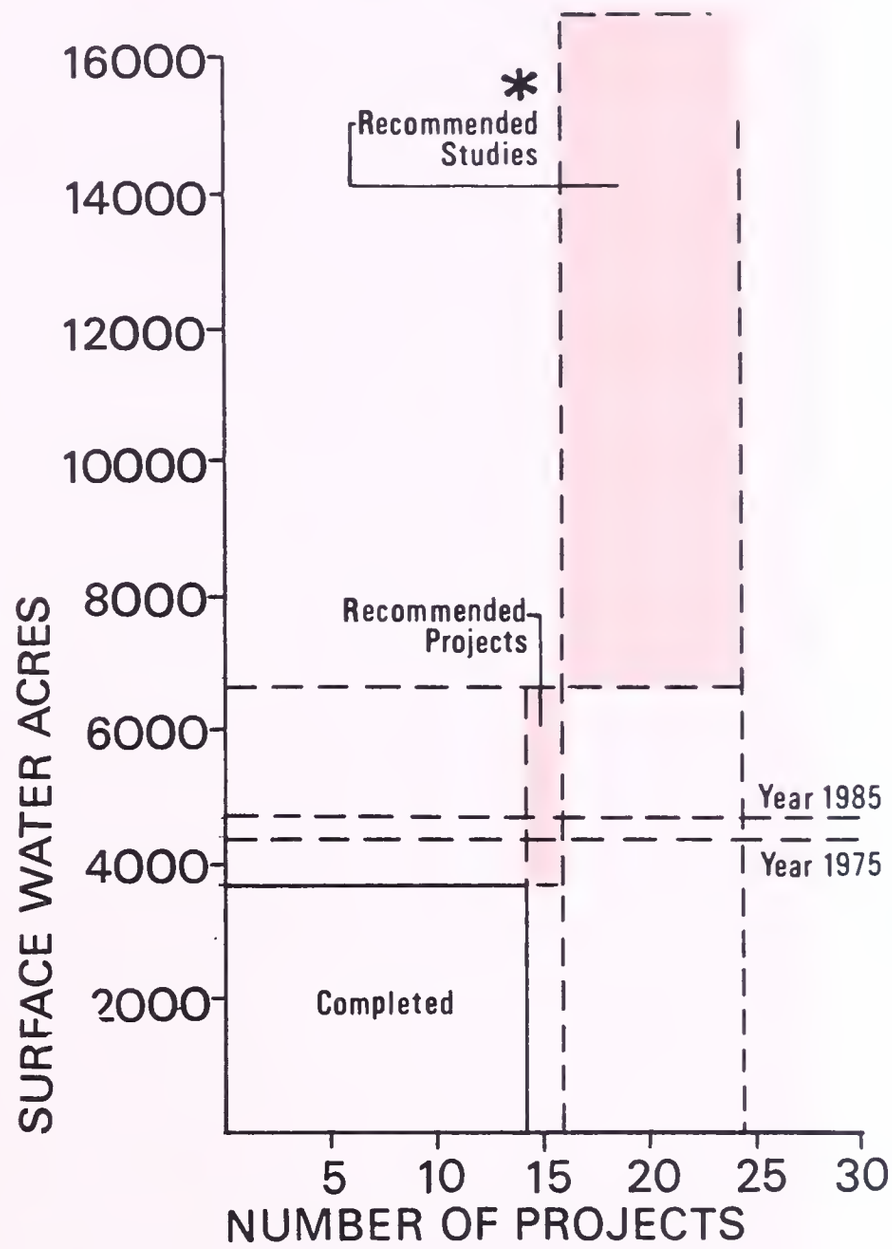
FISHING DEMAND
IN PENNSYLVANIA (1970)



BOATING DEMAND IN WEST VIRGINIA (1985)

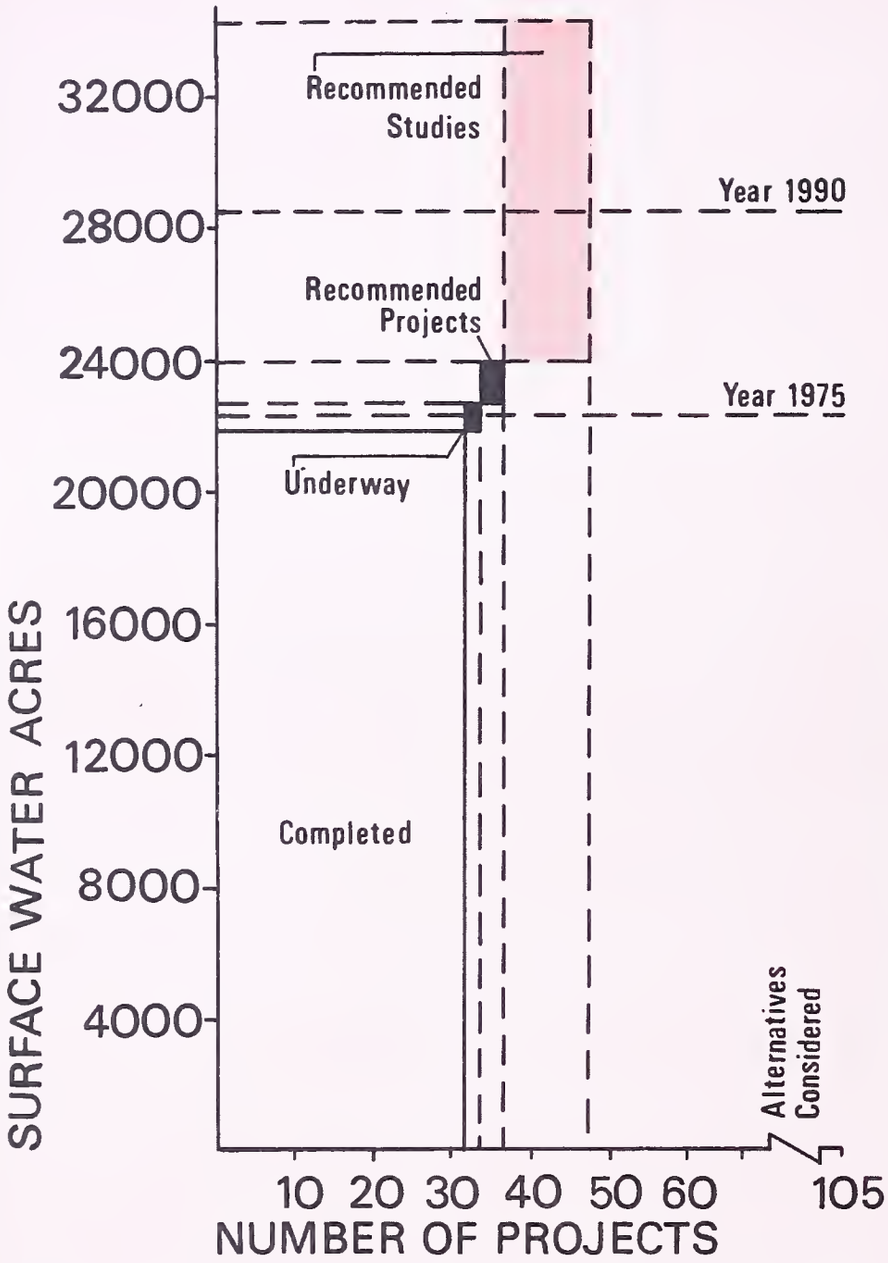


FISHING DEMAND IN WEST VIRGINIA (1985)

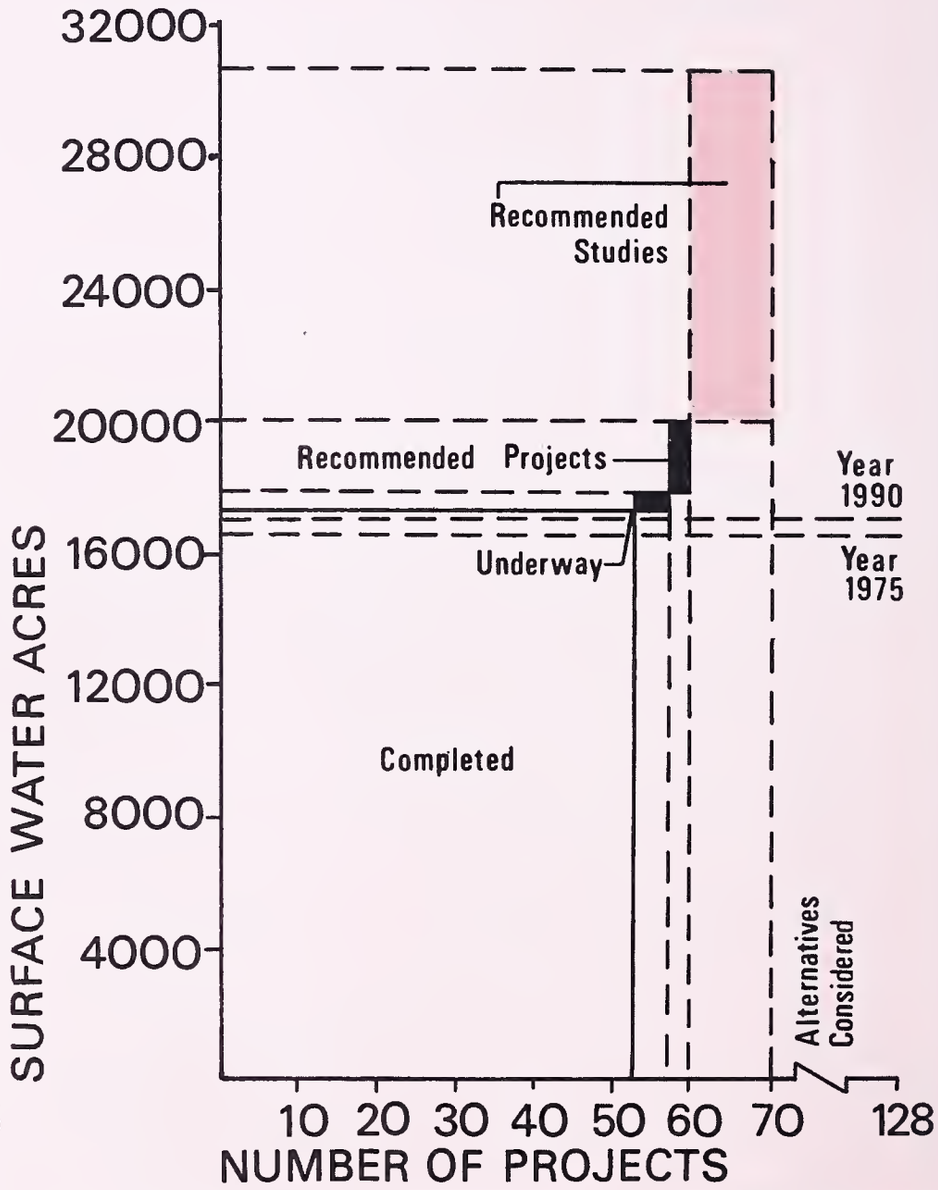


* This is primarily from Rowlesburg Lake. Davis Lake was not resolved and is not included.

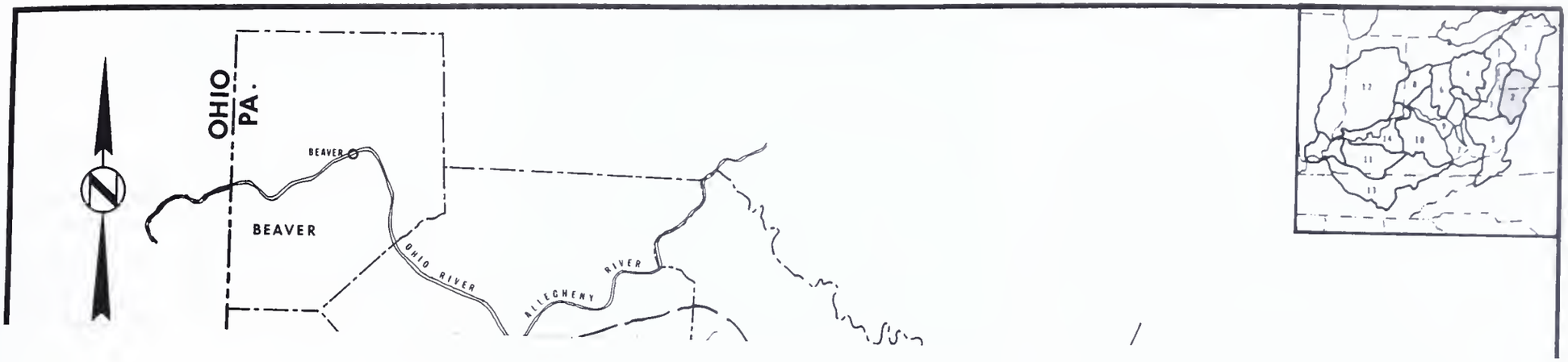
BOATING DEMAND IN THE MONONGAHELA BASIN



FISHING DEMAND IN THE MONONGAHELA BASIN

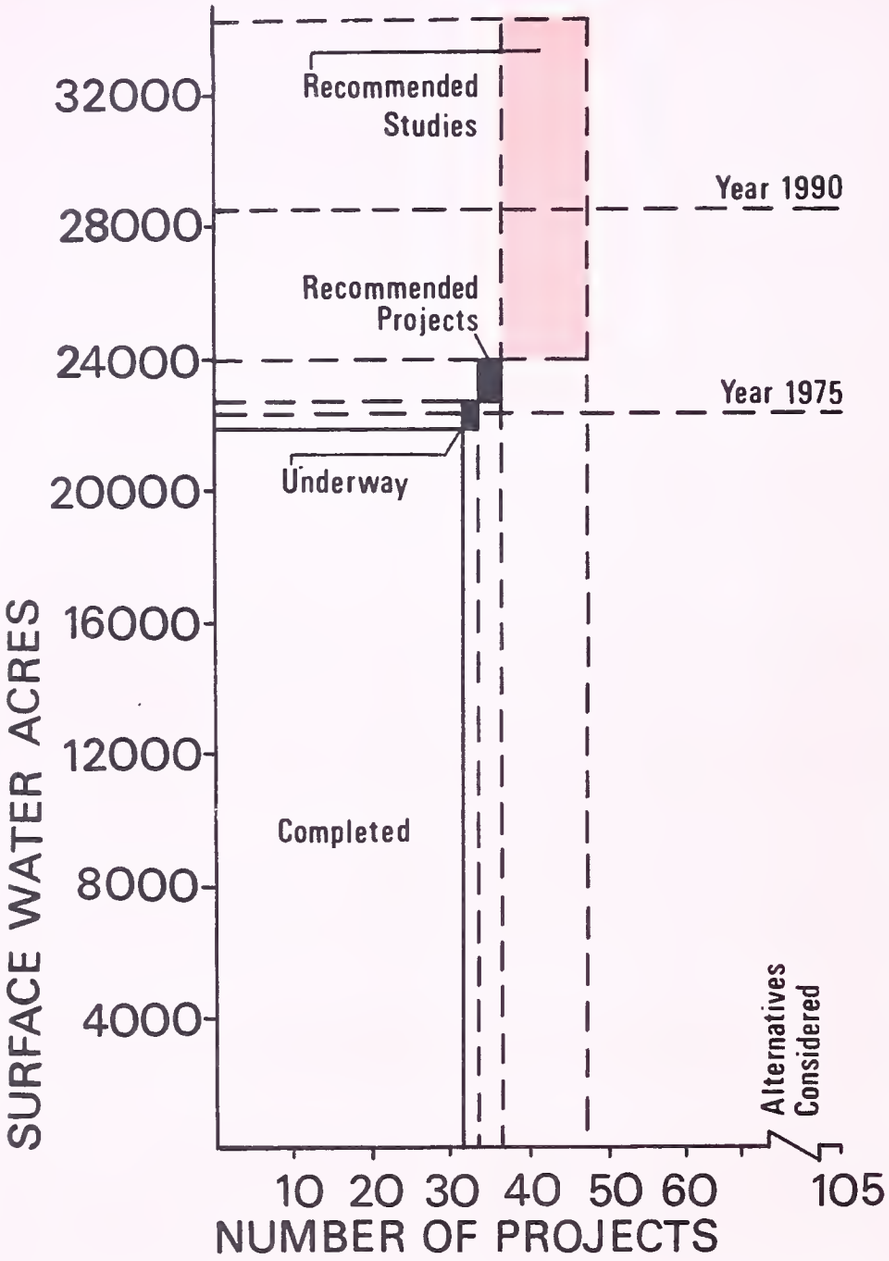


NOTE: Due to differing methodologies, figures are approximate.

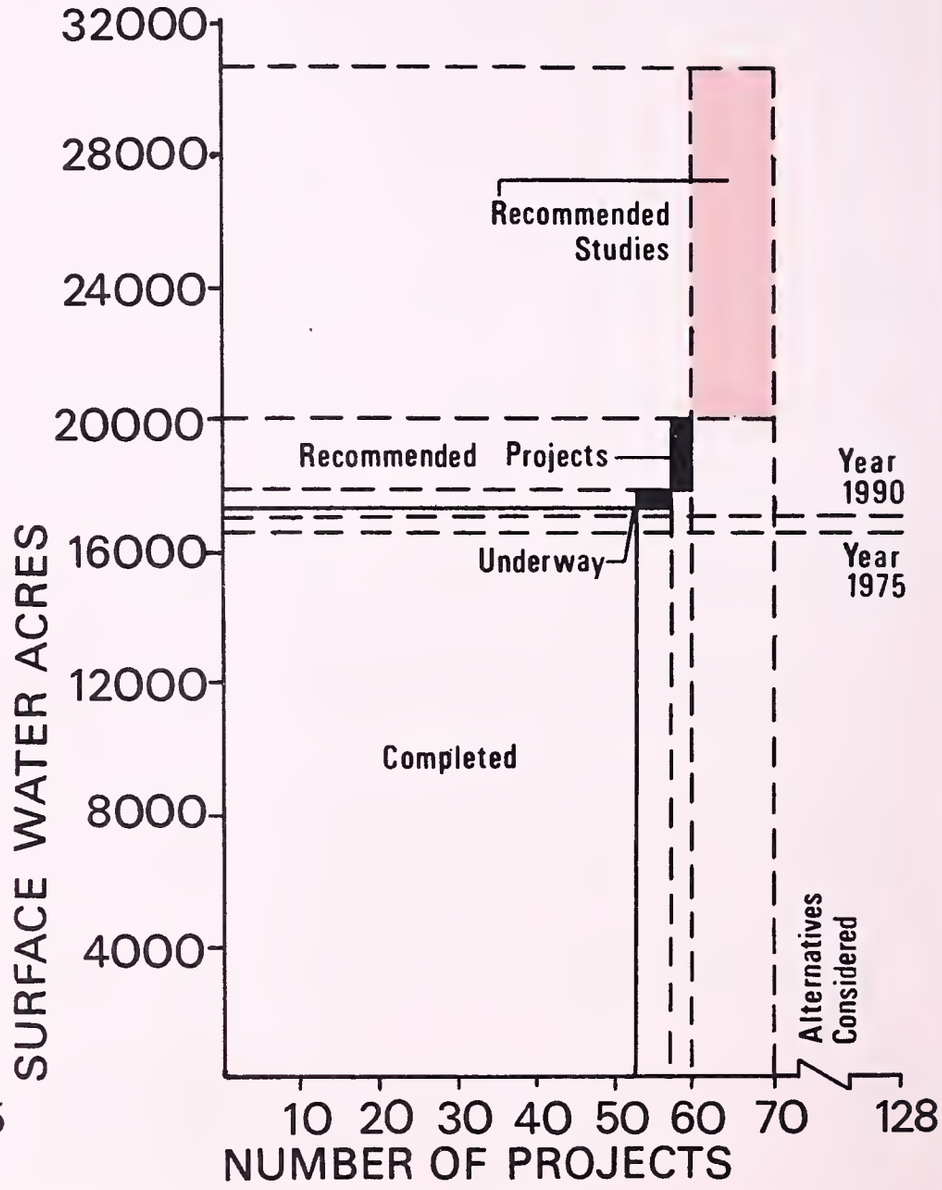


Recommended Plan for Natural, Historic, Recreation

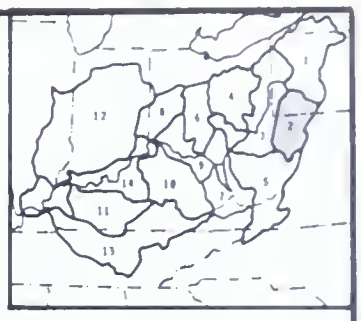
BOATING DEMAND IN THE MONONGAHELA BASIN



FISHING DEMAND IN THE MONONGAHELA BASIN



NOTE: Due to differing methodologies, figures are approximate.



OHIO
PA.
BEAVER
BEAVER
OHIO RIVER
ALLEGHENY RIVER
PITTSBURGH
ALLEGHENY
766
818
GREENSBURG
WASHINGTON
WESTMORELAND
696
MONONGAHELA RIVER
WASHINGTON
802
812
SOMERSET
792
813 814 815
SOMERSET
79°
40°
816
705
817
WAYNESBURG
FAYETTE
UNIONTOWN
791
1037
W. VA.
PA.
GREENE
PA.
MD.
MONONGALIA
MORGANTOWN
MARION
FAIRMONT
783
KINGWOOD
739
705
797
GARRETT
OAKLAND
398
346
HARRISON
PRESTON
389
GRAFTON
CLARKSBURG
TAYLOR
348
113
M.D.
W. VA.
394
87
BARBOUR
688
PHILIPPI
PARSONS
382
349
356
TUCKER
383
WESTON
91
LEWIS
BUCKHANNON
760
755
1041
353
RANDOLPH
UPSHUR
75
POCAHONTAS

NATURAL, HISTORICAL & RECREATIONAL

STUDIES IMPLEMENTATION

- NATIONAL FOREST
- STATE FOREST
- NATIONAL PARK
- STATE PARK
- PUBLIC HUNTING AREA
- WILDLIFE REFUGE
- NATURAL AREA
- ENVIRONMENTAL CORRIDOR
- WILD & SCENIC RIVER
- RECREATION AREA
- HISTORICAL SITE
- ARCHEOLOGICAL SITE

RECOMMENDED PROJECTS & PROGRAMS

Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE

10 0 10 20 Kilometers

10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO
1974

High Quality Fishing Streams

The map entitled "High Quality Fishing Streams" was compiled from information provided in the West Virginia Stream Map, a listing of Pennsylvania Conservation Streams, the Maryland Department of Natural Resources Rules and Regulations, and recommendations from the Planning Workshops and the Natural, Historic, and Recreation Work Groups. No fixed criteria were utilized; rather, inclusion on the map was a subjective judgment based on quality and quantity of fishing opportunities along with consideration of aesthetic amenities. Identified streams may be either warm or cold water. In some cases, streams may have a mine drainage problem that requires abatement before the full fishing potential can be reached.

The purpose of the map is to identify those streams having qualities worthy of consideration for special preservation. The following streams have been identified thus far:

Maryland:

- Youghiogheny River
  - Buffalo Run
  - Laurel Run
  - Salt Block Run
  - Little Youghiogheny
  - Bear Creek
  - Mill Run
  - Puzzley Run
  - Muddy Creek
- Casselman River
  - Main Stem
  - Tributaries

Pennsylvania:

- Youghiogheny River
  (Confluence to Indian Creek)
  - Dunbar Creek
  - Meadow Run
  - Laurel Hill Creek
  - Morgan Run
  - Indian Creek (above Champion)
- Big Sandy
  - Laurel Run
  - Quebec Run
  - Laurel Run (Mill Run)
- Dunkard Creek
  - Main Stem (above Bobtown)
  - Tributaries

West Virginia:

- Dunkard Creek
  - Main Stem
  - Tributaries
- Whiteday Creek
- Three Forks Creek
- Muddy Creek
- Blackwater River
- Shavers Fork

Non-Rated and Rated Canoeable or Whitewater Rivers

The map entitled "Non-Rated and Rated Canoeable or Whitewater Rivers" identifies those streams and rivers which have a high value for canoeing, kayaking, and/or rafting. Consideration should be given to these values when planning projects or programs which would disrupt the free flowing state of these reaches.

Two sources were used to develop the map. In its "Monongahela-Youghiogheny River Basin Outdoor Recreation Planning Guide," the Bureau of Outdoor Recreation (BOR) identified streams which have value for canoeing or whitewater use. The BOR did not rate these resources as to their specific use or difficulty. The rated streams were inventoried by the American Youth Hostels (AYH) in its "Canoeing Guide to Western Pennsylvania/ Northern West Virginia, Edition V." This rating system is based on the following international scale:

International Difficulty Rating
on Canoeable Waters

Water Characteristics

Rating:

- Smooth Water
  - A. Pools, lakes, rivers - velocity under two miles per hour.
  - B. Rivers - velocity two-four mph.
  - C. Rivers - velocity above four mph (maximum back-paddling speed); may have some sharp bends and/or obstructions.
- Whitewater
  - I. Easy-sand-banks, bends without difficulty, occasional small rapids with waves regular and low; correct course easy to find but care is needed with minor obstacles like pebble banks, fallen trees, etc., especially on narrow rivers; river speed less than hard back-paddling speed.

II. Medium-fairly frequent but unobstructed rapids, usually with regular waves, easy eddies, and easy bends; course generally easy to recognize; river speeds occasionally exceeding hard back-paddling speed.

III. Difficult-maneuvering in rapids necessary; small falls, large regular waves covering boat, numerous rapids; main current may swing under brushes, branches, or overhangs; course not always easily recognizable; current speed usually less than fast-forward paddling speed.

IV. Very difficult-long extended stretches of rapids, high irregular waves with boulders directly in current; difficult broken water, eddies, and abrupt bends; course often difficult to recognize and inspection from the bank frequently necessary; swift current; rough water experience indispensable.

V. Exceedingly difficult-long rocky rapids with difficult and completely broken water which must be run head on; very fast eddies, abrupt bends, and vigorous cross currents; difficult landings increase hazard; frequent inspections necessary; extensive experience necessary.

VI. Limit of Navigability-all previously mentioned difficulties increased to the limit; only negotiable at favorable water levels; cannot be attempted without risk of life.

Rivers Rated by the AYH:

- Turtle Creek
  Abers Creek to Trafford – 5 miles (Class I).

- Youghiogheny River
  Sang Run to Friendsville - 9.3 miles (Classes V & VI).
  Confluence to Ohiopyle - 11 miles (Class II).
  Ohiopyle to Stewarton - 7 miles (Classes III & IV).
  Stewarton to South Connellsville - 11 miles (Classes II & III).
  Connellsville to Layton - 12.5 miles (Class B).

- Indianhead Creek
  Jones Mill to Indianhead Lake - 16 miles (Classes I & II).
  Rt. 381 Lake to Youghiogheny River at Camp Carmel - (Classes V & VI).

- Laurel Hill Creek
  Laurel Hill State Park to Rt. 653 - 6.3 miles (Class III).
  Whipkey to Ursina - 8 miles (Classes II & III).

- Casselman River
  Garrett to Markleton - 13.7 miles (Class II).
  Markleton to Ft. Hill - 6 miles (Class III).
  Ft. Hill to Harnesdsville - 5 miles (Classes I & II).

- North Fork Tenmile Creek - 17 miles (Classes I & II).

- South Fork Tenmile Creek - 15.7 miles (Classes I & II).

- Cheat River
  St. George to Rowlesburg - 23.9 miles (Class B).
  Manheim to Railroad Bridge - 5.2 miles (Class III).
  Albright to Jenkins Bridge - 11.4 miles (Classes IV & V).
  Jenkins Bridge to Cheat Lake - 9 miles (Class III).

- Big Sandy Creek
  Bruceton Mills to Rockville - 5.8 miles (Classes III & V).
  Rockville to Jenkins Bridge - 5.2 miles (Class V).

- Blackwater River
  Canaan Valley to Dry Fork River.
  Blackwater Falls to Hendricks (Classes V & VI).

- Laurel Fork of the Cheat (Open Boats).

- Glady Fork of the Cheat, Evenwood to Alpena - 9.0 miles (Classes II & III).

- Shavers Fork of the Cheat, Bemis to Bowden. (Classes II & III).

- Tygart River
  Belington to Philippi - 11 miles (Classes IV & V).
  Valley Falls to Hammond - 1.5 miles (Classes II & VI).

Non-Rated (BOR):

- Monongahela River - Morgantown, W. Va., to Pittsburgh, Pa.

- Youghiogheny River - Jacobs Creek to Confluence.

- Cheat River - Rowlesburg to Muddy Creek.

- Shavers Fork - Parsons to Bemis; Bowden to Origin.

- Glady Fork - Dry Fork to Evenwood, Alpena to Origin.

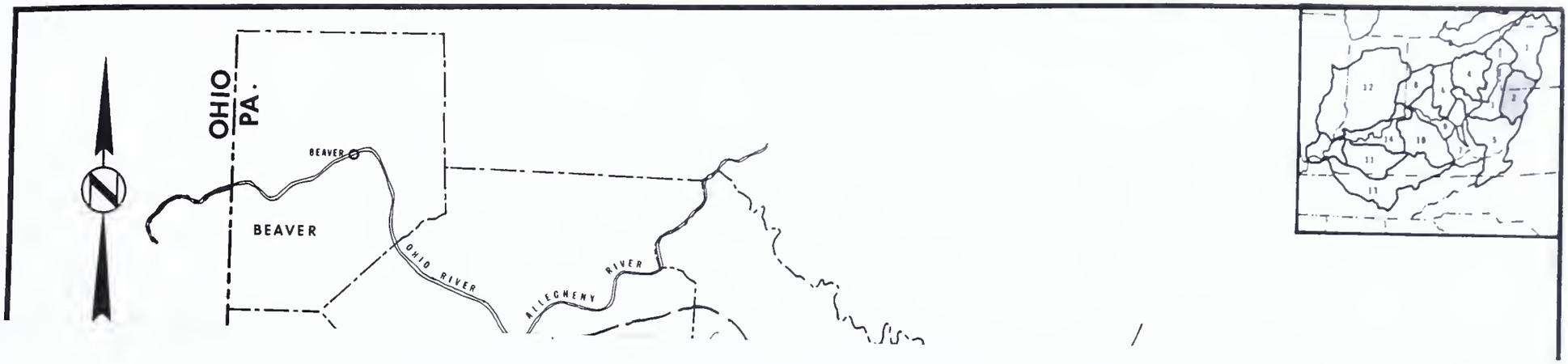
- Gandy Creek.

- Horseshoe Run.

- Red Creek.

- Tygart River - Laurel Creek to Philippi.

- Middle Fork - Tygart River to Right Fork River.



High Quality Fishing Streams

II. Medium-fairly frequent but unobstructed rapids, usually with regular waves, easy eddies, and easy bends; course generally easy to recognize; river speeds occasionally exceeding hard back-paddling speed.

III. Difficult-maneuvering in rapids necessary; small falls, large regular waves covering boat, numerous rapids; main current may swing under brushes, branches, or overhangs; course not always easily recognizable; current speed usually less than fast-forward paddling speed.

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- Indianhead Creek
  Jones Mill to Indianhead Lake - 16 miles (Classes I & II).
  Rt. 381 Lake to Youghiogheny River at Camp Carmel - (Classes V & VI).

- Laurel Hill Creek
  Laurel Hill State Park to Rt. 653 - 6.3 miles (Class III).
  Whipkey to Ursina - 8 miles (Classes II & III).

- Casselman River
  Garrett to Markleton - 13.7 miles (Class II).
  Markleton to Ft. Hill - 6 miles (Class III).
  Ft. Hill to Harnesdsville - 5 miles (Classes I & II).

- North Fork Tenmile Creek - 17 miles (Classes I & II).

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  Bruceton Mills to Rockville - 5.8 miles (Classes III & V).
  Rockville to Jenkins Bridge - 5.2 miles (Class V).

- Blackwater River
  Canaan Valley to Dry Fork River.
  Blackwater Falls to Hendricks (Classes V & VI).

- Laurel Fork of the Cheat (Open Boats).

- Glady Fork of the Cheat, Evenwood to Alpena - 9.0 miles (Classes II & III).

- Shavers Fork of the Cheat, Bemis to Bowden. (Classes II & III).

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  Belington to Philippi - 11 miles (Classes IV & V).
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- Shavers Fork - Parsons to Bemis; Bowden to Origin.

- Glady Fork - Dry Fork to Evenwood, Alpena to Origin.

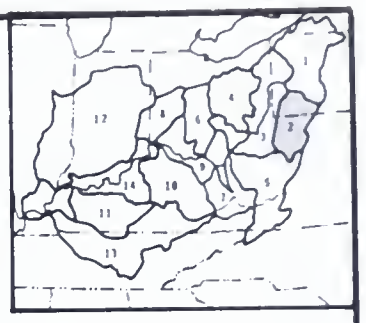
- Gandy Creek.

- Horseshoe Run.

- Red Creek.

- Tygart River - Laurel Creek to Philippi.

- Middle Fork - Tygart River to Right Fork River.



OHIO
PA.
W. VA.
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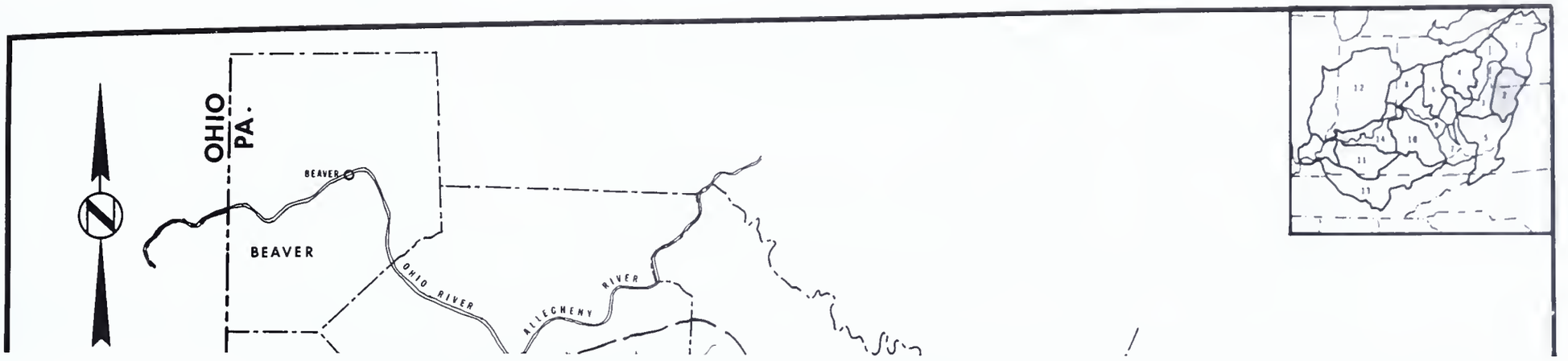
M.D.
W. VA.
BEAVER
ALLEGHENY
WASHINGTON
GREENE
FAYETTE
WESTMORELAND
SOMERSET
MONONGALIA
MARION
HARRISON
TAYLOR
BARBOUR
PRESTON
TUCKER
RANDOLPH
UPSHUR
LEWIS
POCAHONTAS
GARRETT
BEAVER
PITTSBURGH
GREENSBURG
WASHINGTON
SOMERSET
UNIONTOWN
WAYNESBURG
MORGANTOWN
FAIRMONT
KINGWOOD
GRAFTON
CLARKSBURG
PHILIPPI
PARSONS
OAKLAND
WESTON
BUCKHANNON
ELKINS
OHIO RIVER
ALLEGHENY RIVER
MONONGAHELA RIVER
Cheat River
Youghiogheny Res
Deep Creek Lake
Lake Lynn
Tygart Lake
Sandy River
Three Fork
Valley
Buffalo Cr
Dunkard Cr
Browns Cr
Ruff Cr
Tenmile Cr
Paw Paw Cr
Elk Creek
Laurel Run
Horseshoe Run
Blackwater River
Dry Fork
Red Creek
Glady Fk
Shavers Fork
Leading Creek
Middle Fork R
West Fork River
Buckhannon River
Right Fk
Left Fk
Mill Cr
Pleasant Valley
Sandy Creek
Laurel Creek
Casselman River
Little Youghiogheny R
Indian Creek
Jacobs Cr
Sewickley Cr
Jacobs Cr
Saltlick Cr
Beaver Cr
Polk Cr
Stalnaker Run
Teter Cr
Leading Creek
Otter Cr
Big Sandy Cr
Little Sandy Cr
Beaver Cr
Youghiogheny River
Casselman River
Castleman R
Muddy Creek
Three Fork
Tygart River
Valley
Buckhannon
Right Fk
Left Fk
Middle Fork R
West Fork River
Stalnaker Run
Leading Creek
Shavers Fork
Laurel Creek
Glady Fk
Dry Fork
Red



Non-Rated and Rated Canoeable or Whitewater Streams

OHIO
PA.
W. VA.
PA.
PA.
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MD.
W. VA.
BEAVER
ALLEGHENY
WASHINGTON
WESTMORELAND
FAYETTE
GREENE
SOMERSET
MONONGALIA
MARION
HARRISON
TAYLOR
BARBOUR
PRESTON
GARRETT
TUCKER
RANDOLPH
UPSHUR
LEWIS
POCAHONTAS
BEAVER
PITTSBURGH
GREENSBURG
WASHINGTON
UNIONTOWN
WAYNESBURG
SOMERSET
MORGANTOWN
FAIRMONT
KINGWOOD
OAKLAND
GRAFTON
CLARKSBURG
PHILIPPI
PARSONS
WESTON
BUCKHANNON
ELKINS
OHIO RIVER
ALLEGHENY RIVER
MONONGAHELA RIVER
Youghiogheny River
Cheat River
Tygart Valley River
Buckhannon River
West Fork River
Middle Fork River
Casselman River
Deep Creek Lake
79°
40°

SLACK WATER
WHITEWATER (INTERNATIONAL RATINGS I & II)
DIFFICULT WHITEWATER (INTERNATIONAL RATINGS III - VI)
NON-RATED STREAMS

NON-RATED AND RATED CANOEABLE OR WHITEWATER RIVERS

Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE
10 0 10 20 Kilometers
10 0 10 20 Miles

Ref.: Monongahela-Youghiogheny River Basin Outdoor Recreation Survey Planning Guide, Bureau of Outdoor Recreation. Canoeing Guide to Western Pennsylvania/Northern West Virginia, Edition V (1973), Pittsburgh Council, American Youth Hostels.

OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO 1974

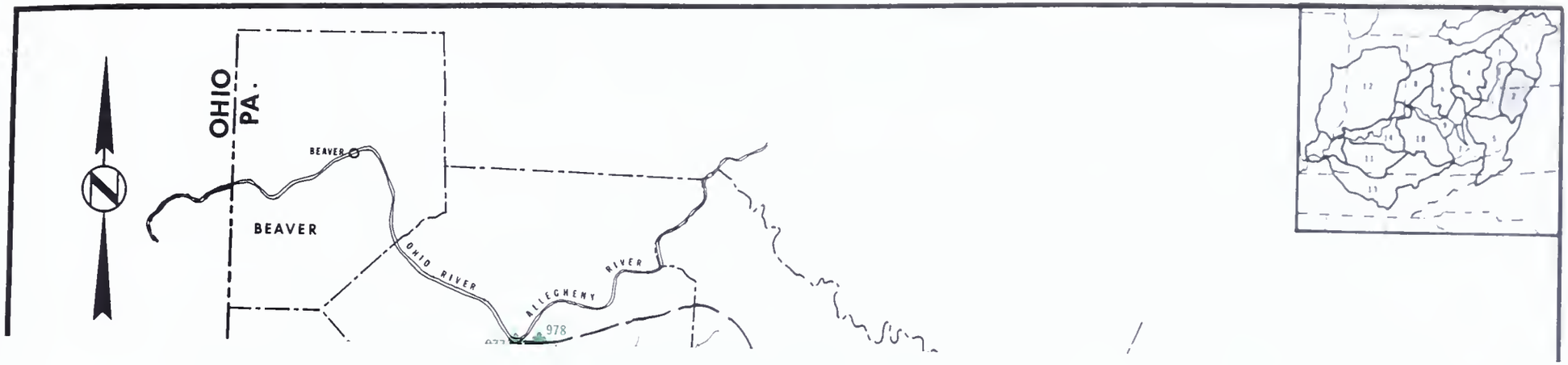
The existing natural and historic areas listed on pages 79 and 80 are in addition to areas already listed in the Commission's baseline. A complete listing is available from the ORBC office.

ADDITIONS TO MONONGAHELA BASELINE OF EXISTING NATURAL AND HISTORIC AREAS

ID	NAME	COUNTY & STATE
984	Old Hannastown	Westmoreland, Pa.
988	Cranesville Swamp Nature Sanctuary	Garret, Md. Preston, W. Va.
989	Beechdale Hollow	Somerset, Pa.
990	Fallingwater	Fayette, Pa.
991	Ferncliff	Fayette, Pa. Somerset, Pa.
992	Lickrun (Lick Hollow)	Fayette, Pa.
993	Quebec Wild Area	Fayette, Pa.
994	Indian Creek Gorge	Fayette, Pa.
995	Bear Run Nature Preserve	Fayette, Pa.
996	Askon Hollow	Fayette, Pa.
997	Confluence Bog	Fayette, Pa.
998	Glade Run Bog	Fayette, Pa.
999	Dolly Sods Wilderness	Randolph, W. Va. Tucker, W. Va.
1000	Rich Mountain Battlefield	Randolph, W. Va.
1001	Phillipi Civil War Battlesite	Barbour, W. Va.

ADDITIONS TO MONONGAHELA BASELINE OF EXISTING NATURAL AND HISTORIC AREAS

ID	NAME	COUNTY & STATE
961	Banacksville Covered Bridge	Marion, W. Va.
962	Old Stone House	Monongalia, W. Va.
963	Brown's Hill Mason and Dixon Survey Term. Point	Monongalia, W. Va.
964	Henry Clay Furnace	Monongalia, W. Va.
965	Alexander Wade House	Monongalia, W. Va.
966	Graceland (Henry Gassaway Davis House)	Randolph, W. Va.
970	Forks of the Ohio, Point Park	Allegheny, Pa.
971	Isaac Mason House (Dr. Christopher Gist Plantation)	Fayette, Pa.
972	Albert Gallatin House (Friendship Hill)	Fayette, Pa.
974	Searights Tollhouse, National Road	Fayette, Pa.
975	Bushy Run Battlefield	Westmoreland, Pa.
976	Carnegie Free Library of Braddock	Allegheny, Pa.
977	Allegheny County Bldgs. (Allegheny County Courthouse and Jail)	Allegheny, Pa.
978	Allegheny Post Office (Old North Post Office)	Allegheny, Pa.
979	Rotunda of the Pennsylvania Railroad Station	Allegheny, Pa.
980	St. Stanislaus Kostka Roman Catholic Church	Allegheny, Pa.
981	Searight's Fulling Mill	Fayette, Pa.
982	Hughes House	Greene, Pa.
983	Greene Hills Farm	Greene, Pa.



Additions to Baseline of Existing Natural and Historic Areas

ADDITIONS TO MONONGAHELA BASELINE OF EXISTING NATURAL AND HISTORIC AREAS

ID	NAME	COUNTY & STATE
961	Banacksville Covered Bridge	Marion, W. Va.
962	Old Stone House	Monongalia, W. Va.
963	Brown's Hill Mason and Dixon Survey Term. Point	Monongalia, W. Va.
964	Henry Clay Furnace	Monongalia, W. Va.
965	Alexander Wade House	Monongalia, W. Va.
966	Graceland (Henry Gassaway Davis House)	Randolph, W. Va.
970	Forks of the Ohio, Point Park	Allegheny, Pa.
971	Isaac Mason House (Dr. Christopher Gist Plantation)	Fayette, Pa.
972	Albert Gallatin House (Friendship Hill)	Fayette, Pa.
974	Searights Tollhouse, National Road	Fayette, Pa.
975	Bushy Run Battlefield	Westmoreland, Pa.
976	Carnegie Free Library of Braddock	Allegheny, Pa.
977	Allegheny County Bldgs. (Allegheny County Courthouse and Jail)	Allegheny, Pa.
978	Allegheny Post Office (Old North Post Office)	Allegheny, Pa.
979	Rotunda of the Pennsylvania Railroad Station	Allegheny, Pa.
980	St. Stanislaus Kostka Roman Catholic Church	Allegheny, Pa.
981	Searight's Fulling Mill	Fayette, Pa.
982	Hughes House	Greene, Pa.
983	Greene Hills Farm	Greene, Pa.

OHIO
PA.
BEAVER
BEAVER
OHIO RIVER
ALLEGHENY RIVER
978
977
PITTSBURGH
975
ALLEGHENY
980
976
970
975
984
GREENSBURG
WASHINGTON
WESTMORELAND
MONONGAHELA RIVER
Youghiogheny
Sewickley Cr
WASHINGTON
981
Redstone Cr
SOMERSET
986
Tenmile Cr
Ruff Cr
Browns Cr
South Fk
982
SOMERSET
79°
40°
Indian Cr
994
995
998
Laurel Hill Cr
Coxes Cr
W. VA.
PA.
983
WAYNESBURG
974
971
UNIONTOWN
990
RIVER
991
FAYETTE
992
Youghiogheny River
996
973
997
989
Whiteley Cr
Dunkard Cr
993
GREENE
972
988
987
PA.
MD.
Dunkard Cr
Lake Lynn
963
969
MONONGALIA
964
MORGANTOWN
962
965
Cheat River
Big Sandy Cr
L Sandy Beaver Cr
Youghiogheny River
Casselman River
968
MONONGAHELA R
Paw Paw Cr
MARION
Buffalo Cr
FAIRMONT
961
KINGWOOD
Deep Creek Lake
GARRETT
Booths Fk
W Booths Cr
Tygart Valley R
OAKLAND
HARRISON
PRESTON
Saltlick Cr
Tenmile Cr
GRAFTON
Three Fork Cr
CLARKSBURG
TAYLOR
Tygart Lake
Sandy River
967
M.D.
W. VA.
Buffalo Cr
Cheat River
BARBOUR
Laurel Run
River
Elk Creek
959
1001
PHILIPPI
Horsenhur Run
Beaver Cr
Blackwater R
PARSONS
Polk Cr
960
WESTON
TUCKER
Glady Fk
Dry Fork
Red Creek
LEWIS
BUCKHANNON
Middle Fork R
West Fork River
Skin Cr
Leading Creek
985
999
ELKINS
966
Glady Fork
Laurel Creek
Shavers Fk
1000
Buckhannon River
Left Fk
RANDOLPH
UPSHUR
Ruth Fk
Mill Cr
Tygart Valley R
POCAHONTAS

HISTORICAL SITE

NATURAL AREA

ADDITIONS TO BASELINE OF EXISTING NATURAL AND HISTORIC AREAS

Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE
10 0 10 20 Kilometers
10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO
1974

Ref. National Register and Subjective Judgement.

Transportation

Assuming that no deviations occur from the historical trend, an extension of the existing commercial waterway up the West Fork River and Youghiogheny Rivers is not justified by the transportation needs generated by the current and projected economic development of the subregion (Corps of Engineers files). The total bulk commodity transported in billion ton miles was 1.79 in 1965 and is projected to be 2.5 btm in 2020. The increasing demand for waterborne transportation along the existing waterway justifies replacing Lock 8 and Lock and Dam 7. Further, the Commission recommends that a detailed study of Dam 2, Lock and Dam 3, and Lock 4 be continued to examine the need for replacement of these older facilities.

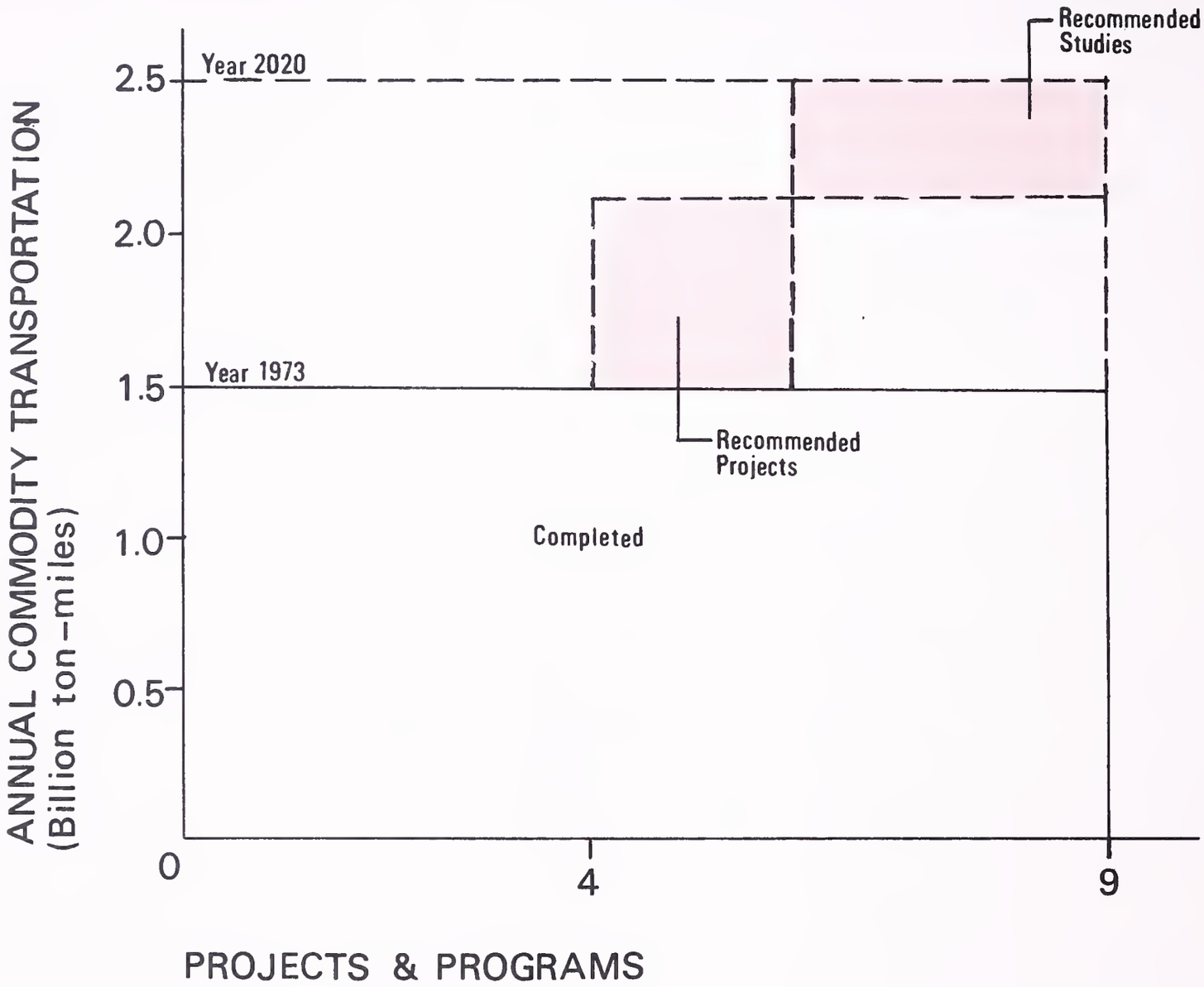
There is sufficient stream flow to operate the current navigation system the majority of the time. However, the low flow may limit maximum operating capacity for short periods during future dry seasons.

Displays following this narrative include a map of the existing navigation system, a table and map for the recommended plan, and a chart comparing the navigation demand with the recommended plan.

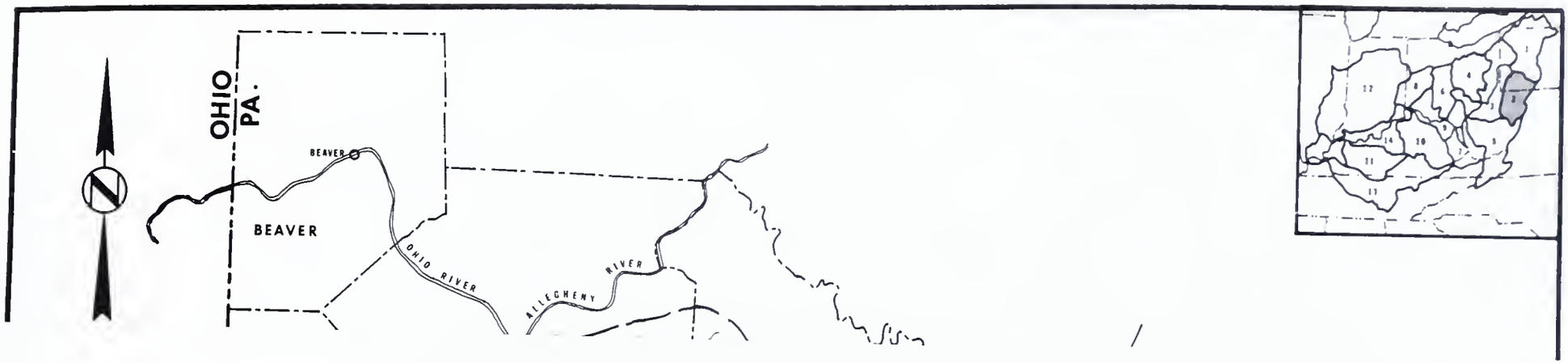
RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	78 79 80	Replacement Study of Lock & Dam 2, 3 & Lock 4	Allegheny, Westmoreland and Washington Co., Pa.	PI	Army	T	—	—	$ 253,000 (1974) - Study Costs
I	82	Gray's Landing (L&D 7 Replacement)	Fayette & Greene Counties, Pa.	I	Army	T	Yes	Yes	$45,800,000 (1974) - Project Costs
I	83	Point Marion (Lock 8 Replacement)	Fayette & Greene Co., Pa.	I	Army	T	Yes	No	$29,800,000 (1974) - Project Costs

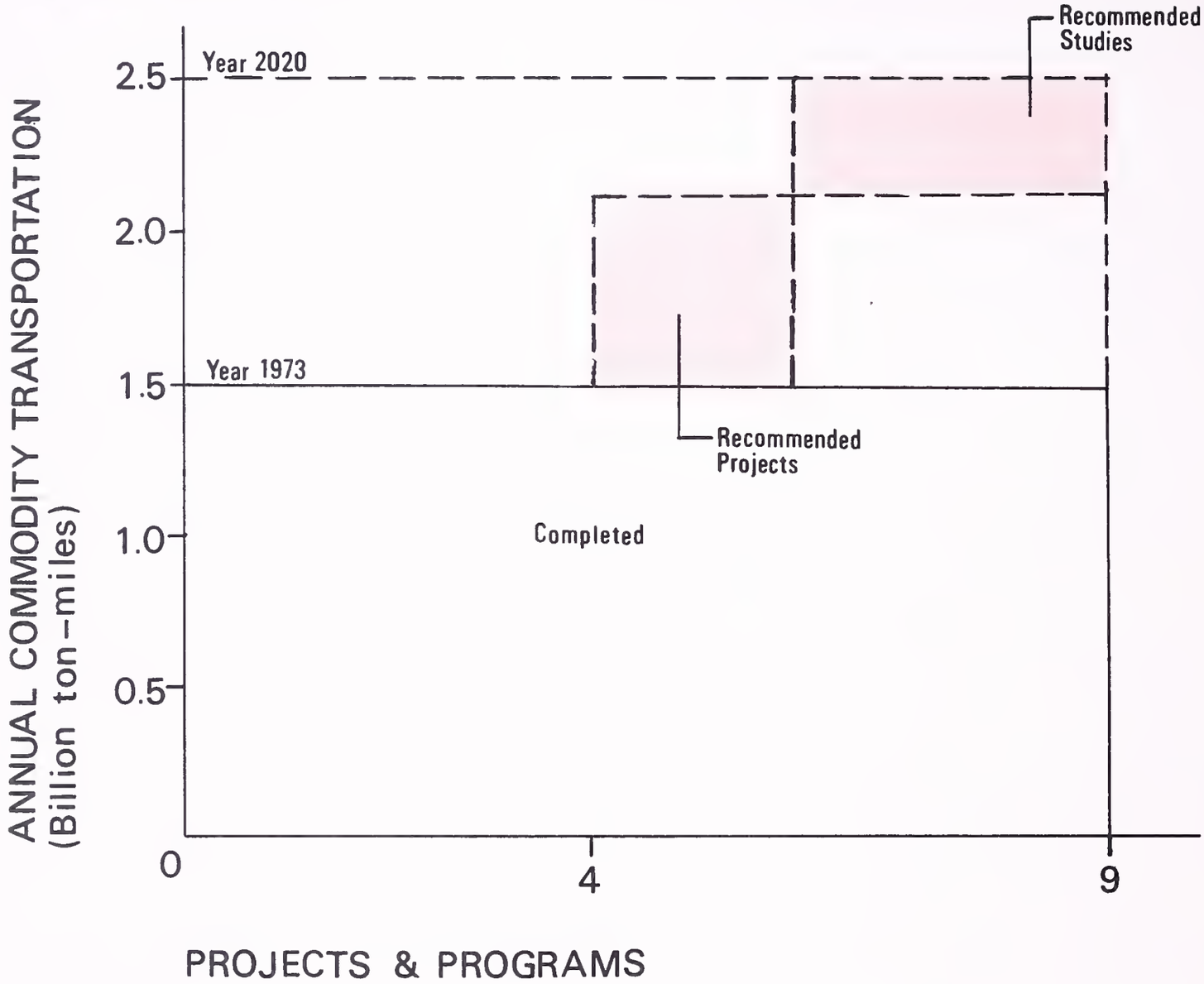
MONONGAHELA - NAVIGATION



NOTE: 4 of the existing facilities are adequate to meet the 2020 requirement.


OHIO
PA.
BEAVER
BEAVER
OHIO RIVER
ALLEGHENY
RIVER

MONONGAHELA - NAVIGATION



NOTE: 4 of the existing facilities are adequate to meet the 2020 requirement.

OHIO
PA.
BEAVER
BEAVER
OHIO RIVER
ALLEGHENY RIVER
PITTSBURGH
ALLEGHENY
WASHINGTON
GREENSBURG
WESTMORELAND
MONONGAHELA RIVER
WASHINGTON
SOMERSET
SOMERSET
79°
40°
W. VA.
PA.
WAYNESBURG
UNIONTOWN
FAYETTE
GREENE
PA.
MD.
MONONGALIA
MORGANTOWN
MARION
FAIRMONT
KINGWOOD
GARRETT
OAKLAND
HARRISON
PRESTON
GRAFTON
CLARKSBURG
TAYLOR
M.D.
W. VA.
BARBOUR
PHILIPPI
PARSONS
TUCKER
WESTON
LEWIS
BUCKHANNON
ELKINS
RANDOLPH
UPSHUR
POCAHONTAS

EXISTING
NAVIGATION SYSTEMS

T LOCK & DAM

NAVIGABLE WATERWAY

Map ID numbers refer to text.

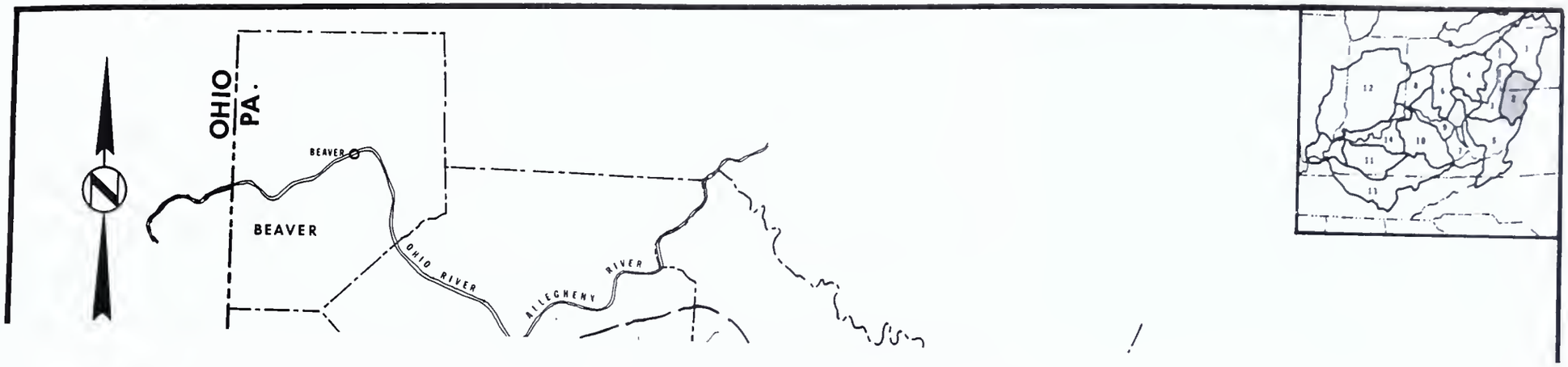
MONONGAHELA RIVER BASIN

SCALE

10 0 10 20 Kilometers

10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO
1974


OHIO
PA.
BEAVER
BEAVER
OHIO RIVER
ALLEGHENY
RIVER

OHIO
PA.
BEAVER
BEAVER
OHIO RIVER
ALLEGHENY RIVER
PITTSBURGH
ALLEGHENY
WASHINGTON
GREENSBURG
WESTMORELAND
MONONGAHELA RIVER
WASHINGTON
SOMERSET
SOMERSET
W. VA.
PA.
WAYNESBURG
UNIONTOWN
FAYETTE
GREENE
L/D 7
L/D 8
PA.
MD.
MONONGALIA
MORGANTOWN
MARION
FAIRMONT
KINGWOOD
GARRETT
OAKLAND
HARRISON
PRESTON
GRAFTON
CLARKSBURG
TAYLOR
M.D.
W. VA.
BARBOUR
PHILIPPI
PARSONS
TUCKER
WESTON
BUCKHANNON
LEWIS
ELKINS
RANDOLPH
UPSHUR
POCAHONTAS

TRANSPORTATION

STUDIES IMPLEMENTATION

LOCK & DAM

PORT FACILITY

RECOMMENDED PROJECTS & PROGRAMS

Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE

10 0 10 20 Kilometers

10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION

CINCINNATI, OHIO 1974

Water Quality

Water quality problems in the Monongahela River Basin are derived from four major sources: domestic sewage, industrial wastes, acid mine drainages, and non-point sources

The water quality recommendations were based on the waste treatment requirements identified under the 1972 Amendments to the Federal Water Pollution Control Act. Effluents from increased industrial activity and municipal growth will have to comply with the regulations established by the 1972 Amendments and any appropriate State restrictions.

Based on the information from the US EPA and States there are 104 communities requiring new construction or upgrading of sewage treatment facilities (see following table). The total estimated cost is $169,783,000. According to the US EPA inventory of National Pollutant Discharge Elimination System (NPDES) applicants, there are 48 major point sources of industrial pollution in the Monongahela River Basin. A complete list of point sources and the types and amounts of pollutants is contained in the State and EPA records. The non-coal mining related industrial discharges are concentrated in the Lower Monongahela River in Allegheny County and also near Morgantown, W. Va. Industrial pollution abatement, which is an enforcement program under jurisdiction of States and Federal Government, may require added investment of Federal funds commensurate with increased activity stimulated by the current energy crisis.

The acid mine drainage problem is the single most serious water quality problem confronting the Monongahela River Basin. According to the Appalachian Regional Commission's (ARC) September 1972 Report, "Development of an Overall Economic/Environmental Plan for the Monongahela River Basin," mine drainage affects 2,410 stream miles or 22 percent of the total 11,084 miles of stream in the basin. According to the US EPA in 1970, 35 percent of the basin's acid load is from industry, 25 percent from inactive mines, and 40 percent from active mines. The mine drainage load was based on 1965 data, and it may now be that the load from inactive mines exceeds that from active mines. The industrial and active mine pollution are considered enforcement problems, but the inactive (abandoned) mine pollution abatement will require sizeable public investment.

According to the ARC report, the extent of the inactive mine problem in the Monongahela Basin includes 40,000 - 50,000 unreclaimed strips: 150 strip sites of 10 acres or more, 1550 acres with evidence of subsidence due to collapse of underground mines, and mine refuse sites of five acres or more at 68 sites. There are a total of 668 inactive mines discharging 389 tons per day of acid. Approximately 70 percent of this pollution is from deep mines.

The program recommended in plan formulation would be to undertake corrective works estimated at $34 million for 154 sites discharging 75 percent of the acidity from inactive (abandoned) mines. Of the 77 EPA zones, 35 include the 154 sites each discharging 1,180 or more lbs/day which are responsible for 75 percent of the abandoned mine drainage pollution problem. As a first priority, 113 sites discharging 50 percent of the acidity can be abated for $13.3 million. There are 17 State abatement projects in addition to those on the ARC list. State estimated costs total $28.5 million.

Pollution from abandoned mines has resulted in loses to environmental quality recreation opportunities and water supply.

The exact make up of the source correction or treatment measures at each site has not yet been identified. In general, the recommendations are a combination of mine sealing and neutralization and will be determined in detail during the design stage prior to construction. Source control corrective works might not be feasible at some underground mines where the structures are not suitable for sealing. Also, where the actual number of openings is greater than that shown by available preliminary survey data, costs for sealing would greatly exceed that which is estimated herein. However, until proven not feasible by detailed site investigations, source control is the preferred approach as it does not entail the continuing operating costs associated with treatment. Treatment at the 154 sites, including neutralization with lime, iron removal, and sludge disposal, would cost an estimated $5.8 million per year for operation and maintenance.

The 75 percent of total basin load contributed by these 154 sites is broken out by drainage basin as follows:

West Fork	25
Lower Monongahela	13
Cheat	13
Youghiogheny	10
Tygart	9
Upper Monongahela	5
	75

Simpson Creek in the West Fork Drainage Basin is by far the largest contributing tributary with 13.4 percent of the first 75 percent of the total basin load. Other tributaries over five percent are the Cheat Mainstem (5.3 percent); Three Fork Creek (5.9 percent) in the Tygart Drainage Basin; and Turtle Creek (5.0 percent) in the Lower Monongahela Drainage Basin.

Currently, only the ARC mine reclamation program and the US EPA research and development program provide Federal assistance for mine drainage abatement. The current level of funding under this program is not adequate to meet the Commission's recommended plan, and the land ownership requirements in the authorizing legislation are too restrictive to address the problem. Inasmuch as the water quality problem resulting from such mine pollution is widespread throughout the Monongahela River Basin, and the benefits accruing to the abatement of such pollution are even more widespread, the Commission recommends that the Congress establish an action program in concert with the States. Appropriate funding, cost sharing, land ownership requirements, and design and construction details need to be resolved.

The recommendation for Federal assistance appears warranted when considering that, historically, the mining of coal has produced nationwide benefits, although the effects from coal mining have been concentrated locally. The costs to correct the pollution from inactive (abandoned) mines are far too high to be absorbed entirely by State or local governments. Coal has been mined to produce energy for the entire Nation. During the Industrial Revolution, coal was the primary source of energy used for production of consumer goods and for power to distribute the products across the Nation. Coal mining soared during all of the Nation's war years. Today, with the complex interconnections of giant utility lines, the Nation is still very dependent on electricity produced with coal. Most of the mines that once produced great quantities of coal are now abandoned; however, they continue to produce acid which seriously degrades the waters of the Monongahela River Basin.

Although there are various other types of nonpoint sources of pollution, sediment is the principal type identified herein as a major problem in the Monongahela Basin.

Some of the critical sediment sources are: road construction, surface mines, timber harvest, agriculture (tilled land), grazing, oil and gas exploration, recreation, and stream bank erosion and urban development. Sediment and erosion results in reduction of property values, filling-in of lakes, maintenance dredging of waterways, etc. Limited data concerning these causes were available for Maryland or Pennsylvania, but information with regard to erosion from streambanks, road construction, and surface mine spoil was available for the West Virginia portion of the Monongahela Basin.

About 1,800 acres of eroding streambanks are causing problems in the West Virginia section of the basin. Of these acres, about ten percent are in the Monongahela River, nine percent in the Cheat River, 52 percent in the Tygart River, and 29 percent in the West Fork River hydrologic planning areas. Also in this portion of the basin, there are 3,000 acres of primary and secondary roads, and 19 acres of interstate and Appalachian Corridor

Abatement of industrial and active mine pollution is considered a State and Federal enforcement action.

road banks eroding. These are classified as major sediment source areas. Surface mine spoils represent 89 percent of the total major sediment source acreage identified in the West Virginia basin. There are 87,700 acres of surface mine spoils in the basin of which 26,800 acres are not vegetated. Eroding mine refuse piles add an additional 1,600 acres of major sediment source for this area.

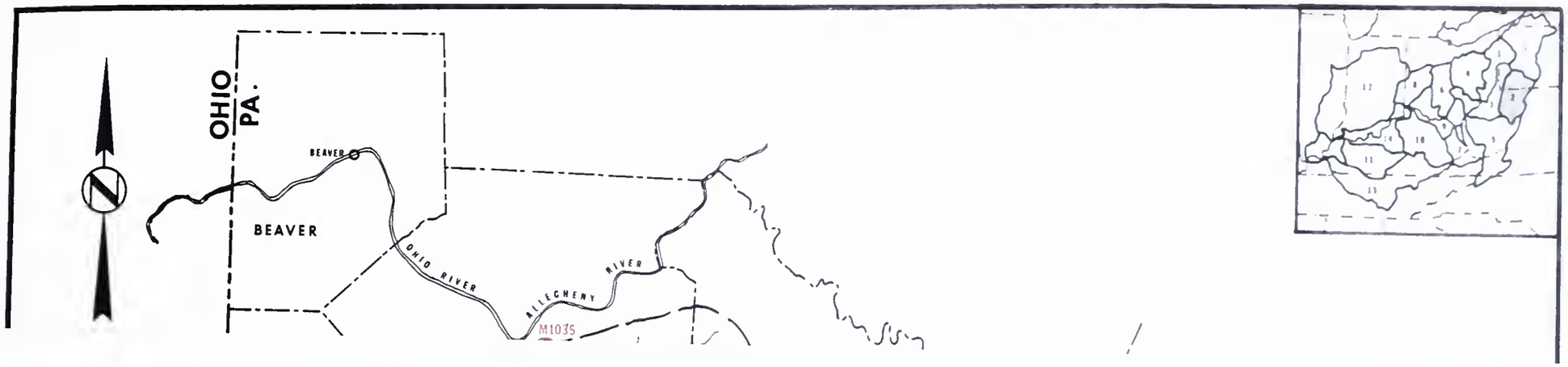
The extent and nature of the sediment problem in the Monongahela Basin needs to be more adequately defined in future studies. Data will be obtained from SCS, USGS gaging stations, and also from the current Army Corps of Engineers study. This latter study (PL 92-611, Section 233) will focus primarily on bank erosion.

The sediment problem was judged important enough for the West Virginia Natural, Historic and Recreation Work Group to propose an implementation study of land management practices for erosion and sediment control in West Virginia.

Displays following this narrative include tables and maps of major municipal and industrial dischargers, maps of active and abandoned mine discharges, a map of the streams affected by mine drainage, a map of the sediment problem, tables and maps for the recommended plans (except tables for domestic sewage and mine drainage projects, which are in the appendix), and charts comparing the water quality improvement with the recommended plan. The mine drainage abatement chart includes only the projects listed in the ARC report. State projects would have to be added on. Use of the water quality improvement axis was not possible with existing information, but can be completed when current State Water Quality Management Plans are complete.

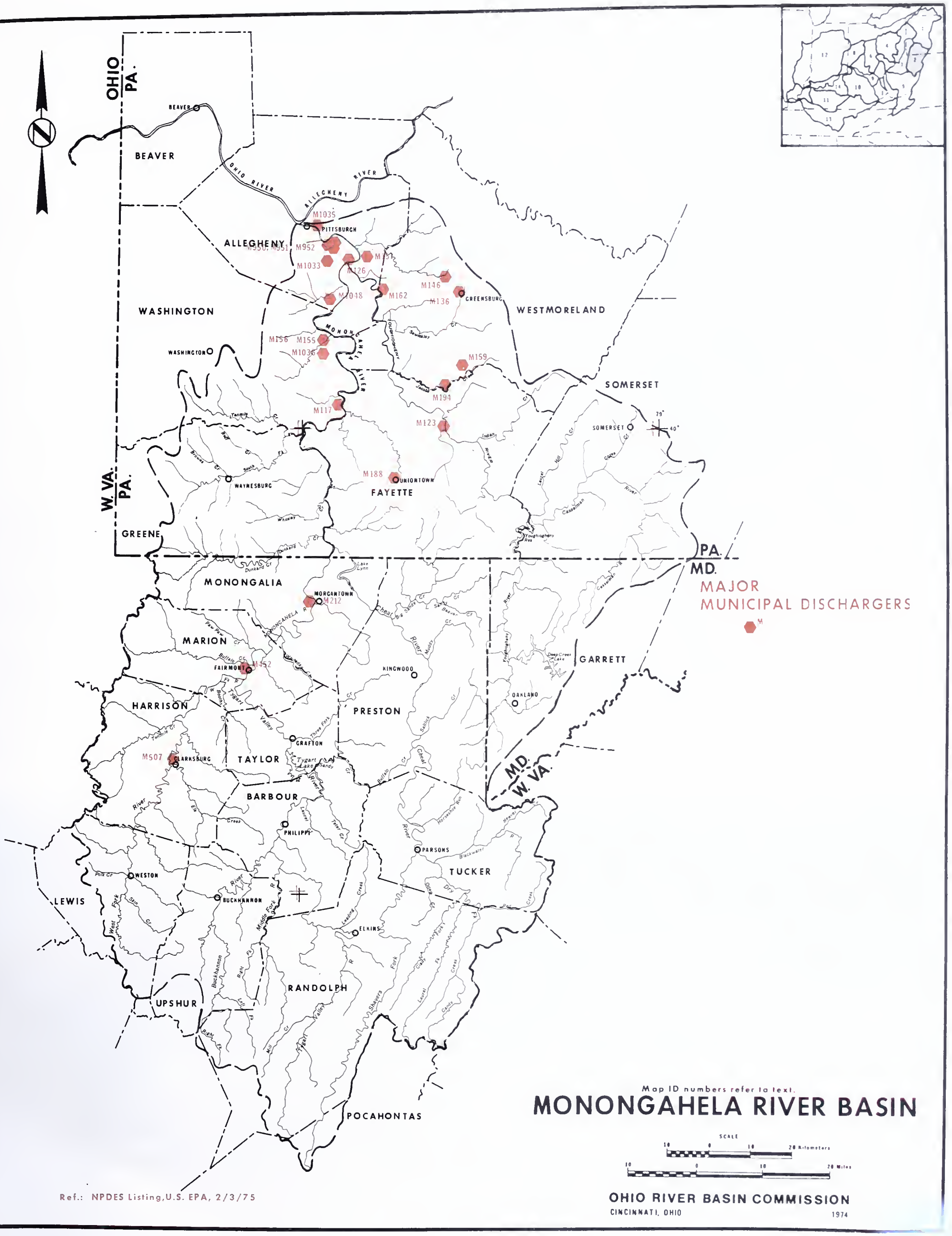
MAJOR MUNICIPAL DISCHARGERS

MAP ID.	NPDES NO.	NAME OF PROJECT	RECEIVING STREAM
117	PA0022241	California Borough	Monongahela River
123	PA0026905	Connellsville Municipal Authority — STP	Youghiogheny River
126	PA0026981	Duquesne Sewage Treatment Plant, City of	Monongahela River
136	PA0027456	Greater Greensburg Sewage Authority — STP	Jacks Run, Slate Run
146	PA0027430	Jeannette City Municipal Authority — STP	Brush Creek
151	PA0026913	McKeesport Municipal Authority, Pollution Control Center	Monongahela/Youghiogheny
155	PA0025950	Monongahela Sewage Treatment Plant	Dry Run Creek to Monongahela
156	PA0026158	Monongahela Valley Sewer Authority	Monongahela River
159	PA0021148	Mount Pleasant Borough	Shupe Run
162	PA0027243	North Huntingdon Township Municipal Authority	Youghiogheny River, Long Run
188	PA0027219	Uniontown Sewage Treatment Plant	Redstone Creek, Lick Run
194	PA0026581	Westmoreland-Fayette Municipal Sewage Authority — STP	Jacobs Creek, Anderson Run
212	WV0023124	Morgantown City Sanitary Board — STP	Monongahela River
452	WV0023353	Fairmont	West Fork River, Monongahela
507	WV0023302	Clarksburg Sanitary Board — STP	West Fork River, Elk Creek
950	PA0026522	West Mifflin Boro — New England STP	Unnamed run to Monongahela
951	PA0026514	West Mifflin Boro — Kenmore Manor STP	Monongahela River
952	PA0026506	West Mifflin Boro — Thompson Run STP	Thompson Run to Monongahela River
1033	PA0027464	Pleasant Hills Authority — Wastewater Treatment Plant	Lick Run, Lewis Run
1035	PA0026425	Penn Hills Township — Lincoln Park Sewage Plant	Shades Run
1036	PA0026891	Charleroi Boro Authority — STP	Monongahela River
1048	PA0026824	Clairton Municipal Authority	Peters Creek


OHIO
PA.
BEAVER
BEAVER
OHIO RIVER
ALLEGHENY
RIVER
M1035

MAJOR MUNICIPAL DISCHARGERS

MAP ID.	NPDES NO.	NAME OF PROJECT	RECEIVING STREAM
117	PA0022241	California Borough	Monongahela River
123	PA0026905	Connellsville Municipal Authority — STP	Youghiogheny River
126	PA0026981	Duquesne Sewage Treatment Plant, City of	Monongahela River
136	PA0027456	Greater Greensburg Sewage Authority — STP	Jacks Run, Slate Run
146	PA0027430	Jeannette City Municipal Authority — STP	Brush Creek
151	PA0026913	McKeesport Municipal Authority, Pollution Control Center	Monongahela/Youghiogheny
155	PA0025950	Monongahela Sewage Treatment Plant	Dry Run Creek to Monongahela
156	PA0026158	Monongahela Valley Sewer Authority	Monongahela River
159	PA0021148	Mount Pleasant Borough	Shupe Run
162	PA0027243	North Huntingdon Township Municipal Authority	Youghiogheny River, Long Run
188	PA0027219	Uniontown Sewage Treatment Plant	Redstone Creek, Lick Run
194	PA0026581	Westmoreland-Fayette Municipal Sewage Authority — STP	Jacobs Creek, Anderson Run
212	WV0023124	Morgantown City Sanitary Board — STP	Monongahela River
452	WV0023353	Fairmont	West Fork River, Monongahela
507	WV0023302	Clarksburg Sanitary Board — STP	West Fork River, Elk Creek
950	PA0026522	West Mifflin Boro — New England STP	Unnamed run to Monongahela
951	PA0026514	West Mifflin Boro — Kenmore Manor STP	Monongahela River
952	PA0026506	West Mifflin Boro — Thompson Run STP	Thompson Run to Monongahela River
1033	PA0027464	Pleasant Hills Authority — Wastewater Treatment Plant	Lick Run, Lewis Run
1035	PA0026425	Penn Hills Township — Lincoln Park Sewage Plant	Shades Run
1036	PA0026891	Charleroi Boro Authority — STP	Monongahela River
1048	PA0026824	Clairton Municipal Authority	Peters Creek


OHIO
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ALLEGHENY RIVER
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M1033
M126
M146
M136
GREENSBURG
M1048
M162
WASHINGTON
WESTMORELAND
MONONGAHELA RIVER
M156
M155
M1036
WASHINGTON
M159
M194
SOMERSET
M117
M123
SOMERSET
79°
40°
W. VA.
PA.
M188
UNIONTOWN
FAYETTE
WAYNESBURG
GREENE
MONONGALIA
MORGANTOWN
M212
MARION
FAIRMONT
M452
KINGWOOD
GARRETT
OAKLAND
HARRISON
PRESTON
GRAFTON
M507
CLARKSBURG
TAYLOR
BARBOUR
PHILIPPI
PARSONS
TUCKER
WESTON
LEWIS
BUCKHANNON
ELKINS
RANDOLPH
UPSHUR
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MD.
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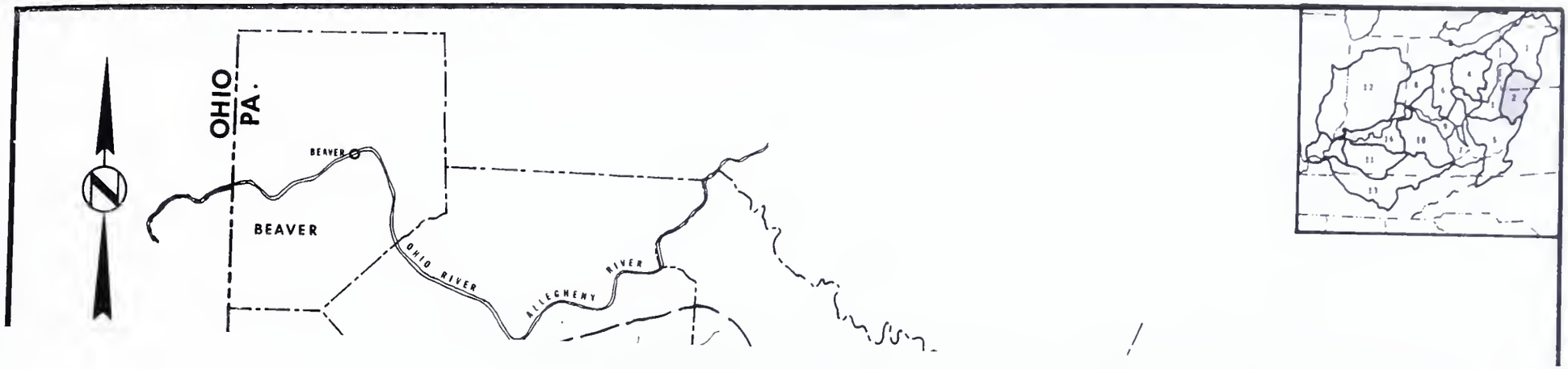
MAJOR
MUNICIPAL DISCHARGERS
M
Map ID numbers refer to text.
MONONGAHELA RIVER BASIN
SCALE
20 Kilometers
20 Miles
OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO
1974
Ref.: NPDES Listing, U.S. EPA, 2/3/75

MAJOR INDUSTRIAL DISCHARGERS

MAP ID.	NPDES NO.	NAME OF PROJECT	RECEIVING STREAM
920	WV0004103	Consolidation Coal Company — Borehole	Robinson Run
921	WV0004090	Consolidated Coal — Mine # 93	Monongahela River
922	WV0004081	Consolidation Coal Company — Dakota	Monongahela River
923	WV0004073	Consolidation Coal Company — 6 South	Pharoah Run
924	WV0004065	Consolidation Coal Company — Stewart	Stewart Run
925	WV0004006	Consolidation Coal Company — Barn Plant	Bingamon Creek
926	WV0003964	Consolidation Coal — Flat Run	Buffalo Creek
927	WV0003913	Consolidation Coal — Whetstone	Buffalo Creek
928	WV0003832	Consolidation Coal — Indian Creek — Dis AW 1	Lower Indian Creek
929	WV0003824	Consolidation Coal — Brewer Dis. #8 mine	Trib. Wades Run
930	WV0003808	Consolidation Coal Company — Wade Run	Trib. Wades Run
931	WV0003760	Consolidation Coal Company — Stewarts	Stewarts Run
932	WV0003689	Consolidation Coal Company — Snider	Dents Run
933	WV0003646	Consolidation Coal — Booth Disch.	Lower Indian Creek
934	WV0003638	Consolidation Coal — Hess Disch.	Dents Run
935	WV0003620	Consolidation Coal — Osage #3	Dents Run
936	WV0003611	Consolidation Coal — Valutto	Dents Run
937	WV0003590	Consolidation Coal Company — Jere Disch.	Trib. Scotts Run
938	WV0003522	Consolidation Coal — Main No. 15	Trib. Scotts Run

MAJOR INDUSTRIAL DISCHARGERS (CON'T)

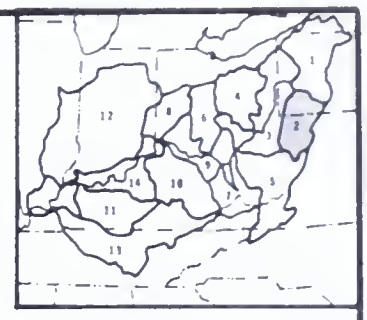
939	WV0003514	Consolidation Coal – Lynch No. 1	Lower Indian Creek
940	WV0003506	Consolidation Coal Company – 41+00 D_1	Trib. Robinson Run
941	WV0003492	Consolidation Coal Co mpany – 114+00	Trib. Robinson Run
942	WV0003464	Consolidation Coal – Christ. Div., #15 mine	Scotts Run
944	PA0001201	Westinghouse Electric Corporation – Semicond.	Sewickley Creek
945	PA0001643	Eastern Association Coal Corporation – Delmont	Buffalo Run
946	PA0001562	Wheeling-Pittsburgh Steel Corp. – Allenport	Monongahela River
947	PA0001554	Wheeling–Pittsburgh Steel Corp. – Monessen	Monongahela River
948	PA0004481	U.S. Steel – Homestead Works	Monongahela River
949	PA0004464	U.S. Steel Corp. – National Duquesne	Monongahela River
953	PA0006131	Jones & Laughlin Steel Corporation	Monongahela River
954	PA 0004081	U.S. Steel – Chisty Park Works	Youghiogheny River
955	PA0004073	U.S. Steel Corp. – Edgar Thompson	Turtle Creek
956	PA0004120	American Chain & Cable – Monessen	Monongahela River
957	PA0005916	National Mine Corporation – Isabella	Monongahela River
958	PA0003042	Allied Chemical Corporation	Monongahela River
1046	PA0001520	Dravo Corp. – Charleroi Plant	Monongahela River
1047	PA0004472	U.S. Steel – Clairton Works	Monongahela River



Major Industrial Dischargers

MAJOR INDUSTRIAL DISCHARGERS (CON'T)

939	WV0003514	Consolidation Coal – Lynch No. 1	Lower Indian Creek
940	WV0003506	Consolidation Coal Company – 41+00 D_1	Trib. Robinson Run
941	WV0003492	Consolidation Coal Co mpany – 114+00	Trib. Robinson Run
942	WV0003464	Consolidation Coal – Christ. Div., #15 mine	Scotts Run
944	PA0001201	Westinghouse Electric Corporation – Semicond.	Sewickley Creek
945	PA0001643	Eastern Association Coal Corporation – Delmont	Buffalo Run
946	PA0001562	Wheeling-Pittsburgh Steel Corp. – Allenport	Monongahela River
947	PA0001554	Wheeling–Pittsburgh Steel Corp. – Monessen	Monongahela River
948	PA0004481	U.S. Steel – Homestead Works	Monongahela River
949	PA0004464	U.S. Steel Corp. – National Duquesne	Monongahela River
953	PA0006131	Jones & Laughlin Steel Corporation	Monongahela River
954	PA 0004081	U.S. Steel – Chisty Park Works	Youghiogheny River
955	PA0004073	U.S. Steel Corp. – Edgar Thompson	Turtle Creek
956	PA0004120	American Chain & Cable – Monessen	Monongahela River
957	PA0005916	National Mine Corporation – Isabella	Monongahela River
958	PA0003042	Allied Chemical Corporation	Monongahela River
1046	PA0001520	Dravo Corp. – Charleroi Plant	Monongahela River
1047	PA0004472	U.S. Steel – Clairton Works	Monongahela River



OHIO
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TUCKER
LEWIS
UPSHUR
RANDOLPH
POCAHONTAS
PRESTON
GARRETT

OHIO RIVER
ALLEGHENY RIVER
MONONGAHELA RIVER

PITTSBURGH
GREENSBURG
WASHINGTON
UNIONTOWN
WAYNESBURG
SOMERSET
MORGANTOWN
FAIRMONT
KINGWOOD
OAKLAND
GRAFTON
CLARKSBURG
PHILIPPI
PARSONS
WESTON
BUCKHANNON
ELKINS

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MAJOR
INDUSTRIAL DISCHARGERS

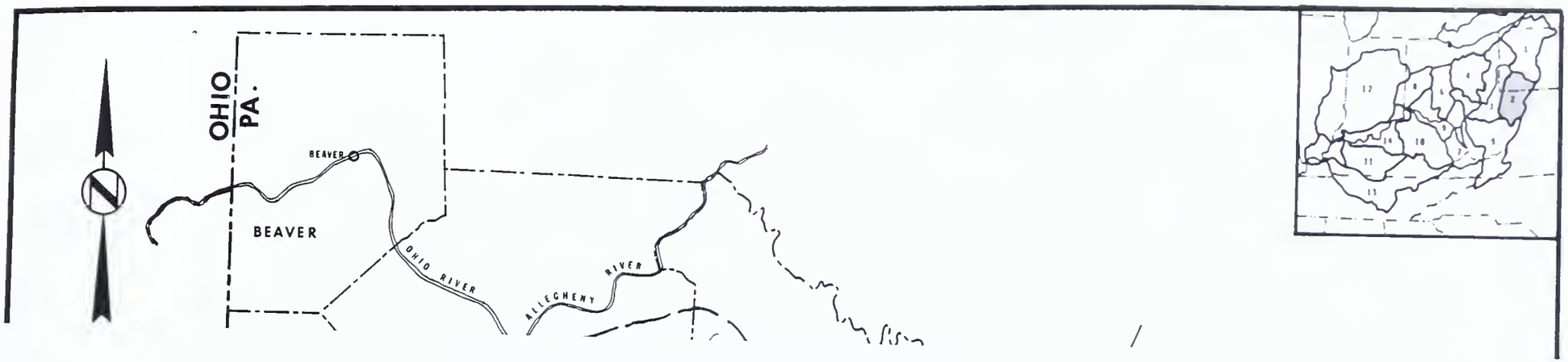
Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE
10 0 10 20 Kilometers
10 0 10 20 Miles

Ref.: NPDES Listing, U.S. EPA, 2/3/75

OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO 1974


OHIO
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BEAVER
BEAVER
OHIO RIVER
ALLEGHENY
RIVER

OHIO
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MD.
MD.
W. VA.

BEAVER
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WASHINGTON
GREENE
FAYETTE
WESTMORELAND
SOMERSET
MONONGALIA
MARION
HARRISON
TAYLOR
BARBOUR
UPSHUR
RANDOLPH
POCAHONTAS
PRESTON
TUCKER
LEWIS
GARRETT

BEAVER
PITTSBURGH
WASHINGTON
GREENSBURG
SOMERSET
WAYNESBURG
UNIONTOWN
MORGANTOWN
FAIRMONT
KINGWOOD
OAKLAND
GRAFTON
CLARKSBURG
PHILIPPI
PARSONS
WESTON
BUCKHANNON
ELKINS

OHIO RIVER
ALLEGHENY RIVER
MONONGAHELA RIVER
Youghiogheny River
Cheat River
Tygart River
West Fork River
Buckhannon River
Middle Fork River
Tygart Lake
Deep Creek Lake
Lake Lynn
Dunkard Cr
Ten Mile Cr
Browns Cr
Wheeling Cr
Three Fork Cr
Sandy Cr
Buffalo Cr
Horseshoe Run
Blackwater R
Laurel Hill Cr
Casselman River
Indian Creek
Glady Fk
Shavers Fk
Laurel Run
Mill Cr
Pringle Fk
Left Fk
Right Fk
Polk Cr
Skin Cr
Leading Creek
Elk Creek
Horner Cr
Big Sandy Cr
Little Sandy Cr
Muddy Creek
Saltlick Cr
Beaver Cr
Deer Cr
Teter Cr
Laurel Creek
Dry Fork
Cabin Run
Coxes Creek
Youghiogheny River
Casselman River

79°
40°

ACTIVE MINE DISCHARGES

Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE
10 0 10 20 Kilometers
10 0 10 20 Miles

Ref: The Status of Active Deep Mines in the Monongahela River Basin, Work Document No. 44, Wheeling Field Office, US EPA, January 1973.

OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO 1974

Abandoned Surface and Deep Mines

OHIO
PA.
BEAVER
BEAVER
OHIO RIVER
ALLEGHENY RIVER
PITTSBURGH
ALLEGHENY
WASHINGTON
WASHINGTON
GREENSBURG
WESTMORELAND
SOMERSET
SOMERSET
ABANDONED
SURFACE & DEEP MINES
W. VA.
PA.
WAYNESBURG
UNIONTOWN
FAYETTE
GREENE
PA.
MD.
MONONGALIA
MORGANTOWN
MARION
FAIRMONT
KINGWOOD
PRESTON
GARRETT
OAKLAND
HARRISON
GRAFTON
TAYLOR
BARBOUR
MD.
W. VA.
PARSONS
TUCKER
WESTON
BUCKHANNON
LEWIS
ELKINS
RANDOLPH
UPSHUR
POCAHONTAS

Ref.: Files, Wheeling Field Office, US EPA, 1973.

Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE
10 0 10 20 Kilometers
10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO
1974

Streams Affected by Mine Drainage

OHIO
PA.
BEAVER
BEAVER
OHIO RIVER
ALLEGHENY RIVER
PITTSBURGH
ALLEGHENY
WASHINGTON
GREENSBURG
WESTMORELAND
MONONGAHELA RIVER
WASHINGTON
SOMERSET
SOMERSET
W. VA.
PA.
WAYNESBURG
UNIONTOWN
FAYETTE
GREENE
PA.
MD.
MONONGALIA
MORGANTOWN
MARION
FAIRMONT
KINGWOOD
GARRETT
OAKLAND
HARRISON
PRESTON
GRAFTON
CLARKSBURG
TAYLOR
MD.
W. VA.
BARBOUR
PHILIPPI
PARSONS
TUCKER
WESTON
BUCKHANNON
LEWIS
ELKINS
RANDOLPH
UPSHUR
POCAHONTAS

MINE DRAINAGE PROBLEMS

STREAMS CONTINUOUSLY AFFECTED BY MINE DRAINAGE

STREAMS INTERMITTENTLY OR POTENTIALLY AFFECTED BY MINE DRAINAGE

Ref.: Development of an Overall Economic/Environmental Plan for the Monongahela River Basin by ARC, Sept. 1974

Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

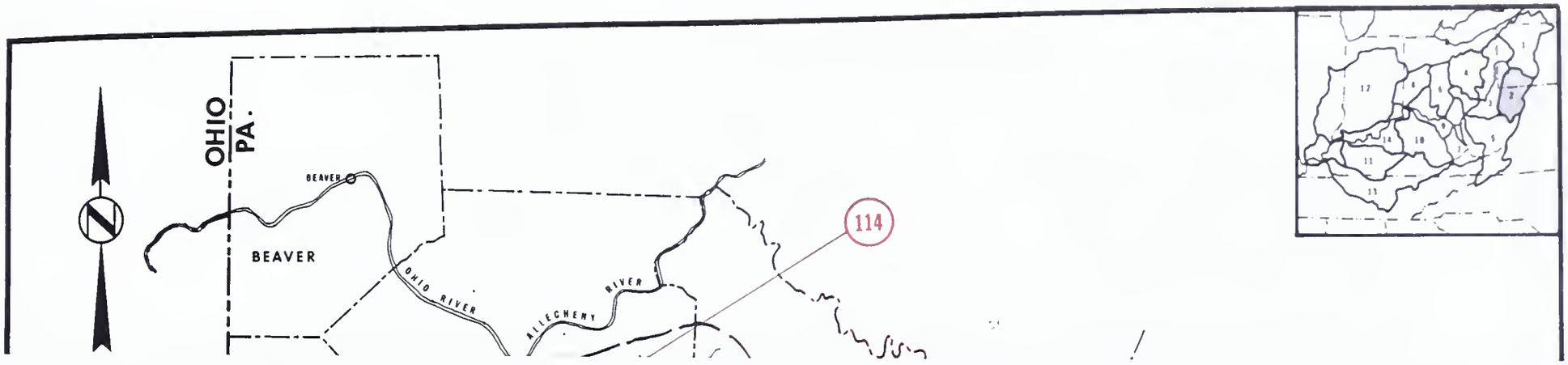
SCALE

10 0 10 20 Kilometers

10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION

CINCINNATI, OHIO 1974


OHIO
PA.
BEAVER
BEAVER
OHIO RIVER
ALLEGHENY RIVER
114

OHIO
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PA.
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M.D.
W. VA.

BEAVER
ALLEGHENY
WASHINGTON
GREENE
WESTMORELAND
SOMERSET
FAYETTE
MONONGALIA
MARION
HARRISON
TAYLOR
BARBOUR
PRESTON
TUCKER
RANDOLPH
UPSHUR
LEWIS
POCAHONTAS
GARRETT

BEAVER
PITTSBURGH
WASHINGTON
GREENSBURG
SOMERSET
WAYNESBURG
UNIONTOWN
MORGANTOWN
FAIRMONT
KINGWOOD
OAKLAND
GRAFTON
CLARKSBURG
PHILIPPI
PARSONS
WESTON
BUCKHANNON
ELKINS

OHIO RIVER
ALLEGHENY RIVER
MONONGAHELA RIVER
Youghiogheny River
Cheat River
Tygart River
Buckhannon River
Middle Fork River
West Fork River
Blackwater River
Dunkard Cr.
Ruff Cr.
Browns Cr.
South Fork
Whiteley Cr.
Indian Cr.
Laurel Hill Cr.
Casselman River
Big Sandy Cr.
Little Sandy Cr.
Beaver Cr.
Muddy Cr.
Saltlick Cr.
Buffalo Cr.
Horseshoe Run
Otter Cr.
Leading Cr.
Laurel Cr.
Shavers Fork
Glady Fork
Mill Cr.
Valley Cr.
Pringle Run
Paw Paw Cr.
Lake Lynn
Deep Creek Lake
Youghiogheny Lake

114
180
125

79°
40°

SEDIMENT PROBLEMS

SEDIMENT YIELD IN TONS
PER Sq. Mi. PER YEAR

- 35-50
- 50-100
- 70-200
- 150-800
- TONS/Sq. Mi. at GAUGE

Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE
10 0 10 20 Kilometers
10 0 10 20 Miles

Ref.: Water Resources of the Monongahela River Basin, W. Va.-by USGS 1967 Harrisburg, Pa. Office of USGS.

OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO
1974

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	91	Stonewall Jackson Lake & State Park	West Fork River above Weston, WV	I	Army	NHR, WQC, WS, FDA	Yes	Yes	$ 87,500,000 (1974) Project Cost. Include: Water Quality Storage. Require Mine Drainage Abatement. In a coal bearing formation, buffer should be maintained between the lake and any active mining. A court hearing is presently being scheduled. Principal complaints have been the lack of a detailed consideration of up-stream reservoirs and disagreements as to B/C calculations.
I	112	Rowlesburg Lake	Preston & Tucker Co., W. Va.	DP	Army	NHR,WS, FDA,WQC	Yes	No	At the request of West Virginia the Corps is in the process of examining various alternatives to the project. Flow regulation for Cheat Wild and Scenic River should be considered. A re-evaluation of the need and feasibility of storage for low flow augmentation should be made. Water supply was not a part of the original authorization.
II	346	Three Forks Creek Watershed	Preston, Taylor, & Monongalia Co., W. Va.	DP	USDA	NHR, WQC, WS, FDA	Yes	Yes	$2,515,000 (1966) - Project Cost $ 350,000 - Study Cost (National Average)
I	383	Hackers Creek Watershed	Harrison, Lewis & Upshur Counties, W.Va.	DP	USDA	NHR, WQC, WS, FDA	Yes	Yes	$2,652,000 (1970) - Project Cost $ 350,000 - Study Cost (National Average) US Fish and Wildlife Service has provided guidelines for the channel modifications. West Va. DNR has given conditional agreement to the project.

RECOMMENDED PLAN

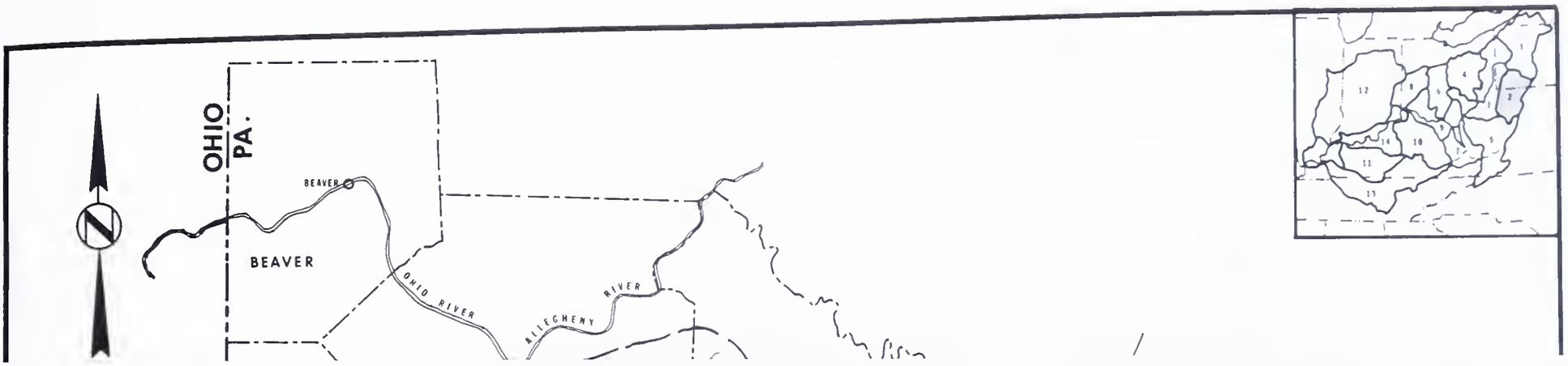
PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	394	Simpson Creek Watershed	Harrison, Taylor & Barbour, W. Va.	DP	USDA	NHR, WQC, WS, FDA	Yes	Yes	$2,618,700 (1966) - Project Cost $ 350,000 - Study Cost (National Average) The watershed has mine drainage abatement problems.
I	688	Elk Creek Watershed	Barbour, Harrison & Upshur Counties, W. Va.	I	USDA	NHR, WQC, FDA	Yes	Yes	$20,707,200 (1972) - Concurrent mine drainage abatement is now underway by the State of West Virginia.
I	697	Upper Casselman River Watershed PL 566	Somerset Co.,Pa. Garrett Co., Md.	DP	USDA	NHR, FDA, WQC, FS	Yes	Yes	$4,450,000 (1969) - Project Costs $ 350,000 Study Costs (National Average) Requires mine drainage abatement.
I	703	Little Youghiogheny Sanitary District - Deer Park - Oakland - Lochlynn Heights - Mountain Lake	Garrett Co., Md.	DP	State Local	WQC, WS	Yes	Yes	$261,000 Study Cost 303 e for WQC and local planning for WS.
I	766	Turtle Creek Basin Study	Westmoreland County, Pa.	DP	Army	NHR, WQC, WS, FDA	Yes	Yes	$450,000 (1974) - Study Cost
I	794	Deep Creek Lake Management and Development Agreement	Garrett, Md.	DP	Md., Penelec Corp.	NHR, WQC	Yes	Yes	Covered by Exhibit R of Penelec. Application to FPC (Zoning changes Buffer zones, Wildlife Refuges, Sanitation Facilities, Recreation Facilities), Penelec Costs $250,000 (1972) State Costs - $100,000

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	801	Provide for increased State and Federal funding for abandoned mine drainage and State enforcement programs for mine and industrial discharges. This may require U.S. Congressional legislation.	Nationwide	I	Congress	WQC	Yes	Yes	This increased funding for abatement is justified by the past National use of this resource. Project Costs abatement measures are $30,744,000 for Priority Group I (0 to 5 years) and $20,700,000 for Priority Group II (6 to 15 years). No costs were available for the enforcement program.
I	803	Study of Water Quality Improvement and degradation in the Mon Basin.	Basinwide	PI	ARC, States	NHR,WQC, WS	—	—	$ 30,000 Study Costs Study would include an examination of the effects of large and small impoundments on water quality. The study should tie into the Army Bank Erosion Study and the State WQ Management Plans.
I	806	Develop recommendations to improve land management practices for erosion and sediment control	West Virginia	PI	W. Va.	WQC	—	—	$ 30,000 Study Costs The Study would include examination of improved practices (including regulation if necessary) for erosion and sediment from timber harvesting, strip mining, road construction, urban development, farming, etc. Examples reported during the Level B effort include: poor timbering practices in the high value natural resource areas of East Randolph and Tucker Counties, sediment damage to the Bowden fish hatchery from Corridor H highway construction, and sediment deposits in Lake Lynn from upstream strip mining. There is a bill in the State Legislature on erosion and sediment control.

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	814	Park Improvement Sanitary Facilities, Kooser & Laurel Hill State Park	Somerset, Pa.	I	Pa./ USDI	NHR, WQC	Yes	Yes	$1,600,000 (Preliminary)
I	815	Water Distribution and Sewer - Laurel Hill State Park	Somerset, Pa.	I	Pa./ USDI	NHR, WQC	Yes	Yes	$1,071,000
I	888	State determination by stream reach, of minimum low stream flow requirements for aquatic life.	Basinwide	DP	W. Va., Md., Pa.	NHR, WQ, WS	Yes	Yes	No costs available. To be done by the individual states. Low flow standards should be in terms of depth and velocity of flow for minimum maintenance of aquatic life and for maintenance of a satisfactory fishery.
I	1038	State legislation should be passed to require reclamation at mine prospecting sites.	Statewide	I	Md., Pa., W. Va.	WQC	Yes	Yes	No government costs.
I, II		Orphan Mine Drainage Abatement Projects (A table listing the projects follows).	Basinwide	DP, I	State/ Fed.	WCQ	Yes	Yes	Detailed planning costs not available. Project cost for Priority Group I is $42,126,000 and Priority Group II is $20,335,000.
I		Domestic Sewage Facility Needs for Construction (A table listing the projects follows).	Basinwide	I	State/ EPA	WQC	Yes	Yes	Project costs for Priority Group I $76,585,200 and Priority Group II is $ 99,229,000.



Recommended Plan for Water Quality Improvement

RECOMMENDED PLAN

PRIORITY	MAP ID	PROJECT/ PROGRAMS	COUNTY/ STATE	TYPE OF EFFORT	PRINCIPAL AGENCY	FUNCTIONAL NEEDS ADDRESSED	PRINCIPLES & STANDARDS NED	PRINCIPLES & STANDARDS EQ	COSTS & COMMENTS
I	814	Park Improvement Sanitary Facilities, Kooser & Laurel Hill State Park	Somerset, Pa.	I	Pa./ USDI	NHR, WQC	Yes	Yes	$1,600,000 (Preliminary)
I	815	Water Distribution and Sewer - Laurel Hill State Park	Somerset, Pa.	I	Pa./ USDI	NHR, WQC	Yes	Yes	$1,071,000
I	888	State determination by stream reach, of minimum low stream flow requirements for aquatic life.	Basinwide	DP	W. Va., Md., Pa.	NHR, WQ, WS	Yes	Yes	No costs available. To be done by the individual states. Low flow standards should be in terms of depth and velocity of flow for minimum maintenance of aquatic life and for maintenance of a satisfactory fishery.
I	1038	State legislation should be passed to require reclamation at mine prospecting sites.	Statewide	I	Md., Pa., W. Va.	WQC	Yes	Yes	No government costs.
I, II		Orphan Mine Drainage Abatement Projects (A table listing the projects follows).	Basinwide	DP, I	State/ Fed.	WCQ	Yes	Yes	Detailed planning costs not available. Project cost for Priority Group I is $42,126,000 and Priority Group II is $20,335,000.
I		Domestic Sewage Facility Needs for Construction (A table listing the projects follows).	Basinwide	I	State/ EPA	WQC	Yes	Yes	Project costs for Priority Group I $76,585,200 and Priority Group II is $ 99,229,000.

OHIO
PA.
BEAVER
BEAVER
OHIO RIVER
ALLEGHENY RIVER
PITTSBURGH
ALLEGHENY
425
429
165
166
169
GREENSBURG
WESTMORELAND
WASHINGTON
MONONGAHELA RIVER
WASHINGTON
448
SOMERSET
814
815
SOMERSET
79°
40°
442
Tenmile Cr
Raff Cr
Browns Cr
South Fk
WAYNESBURG
UNIONTOWN
FAYETTE
Indian Creek
Laurel Hill Creek
Casselman River
413
W. VA.
PA.
Whiteley Cr
GREENE
461
Dunkard Cr
464
Youghiogheny Res
PA.
MD.
Lake Lynn
MONONGALIA
459
MORGANTOWN
487
489
494
500
529
Cheat
Big Sandy
L Sandy
Beaver Cr
Paw Paw Cr
496
MONONGAHELA
482
Muddy Creek
520
597
Casselman River
420
417
MARION
483
488
Buffalo Cr
FAIRMONT
452
Tygart Valley River
445
506
Fk
Booths Cr
Tygart
Valley
346
KINGWOOD
PRESTON
521
Saltlick Cr
Youghiogheny River
791
Deep Creek Lake
GARRETT
HARRISON
514
Tenmile Cr
508
GRAFTON
Three Fork Cr
422
OAKLAND
419
703
418
421
507
CLARKSBURG
TAYLOR
Tygart Lake
Sandy Fk
509
513
394
Buffalo Cr
Cheat River
MD.
W. VA.
511
River
515
Elk
688
Creek
BARBOUR
Laurel Fk
Teter Cr
470
PHILIPPI
518
522
Horseshoe Run
Beaver Cr
460
383
PARSONS
Blackwater R
516
Polk Cr
WESTON
TUCKER
Otter Creek
Dry Fk
River
340
BUCKHANNON
Middle Fork R
LEWIS
Skin Cr
West Fk
91
Leading Creek
ELKINS
410
Buckhannon
Rush Fk
Left Fk
Right Fk
441
UPSHUR
RANDOLPH
Shavers Fk
Laurel Creek
Cabin Creek
Mill Cr
Pearl
Valley
437
444
POCAHONTAS

WATER QUALITY CONTROL

STUDIES
IMPLEMENTATION

- DOMESTIC WASTEWATER TREATMENT FACILITIES
- SPECIAL WASTEWATER TREATMENT FACILITIES
- LOW FLOW AUGMENTATION
- DISPERSED SOURCES CONTROL

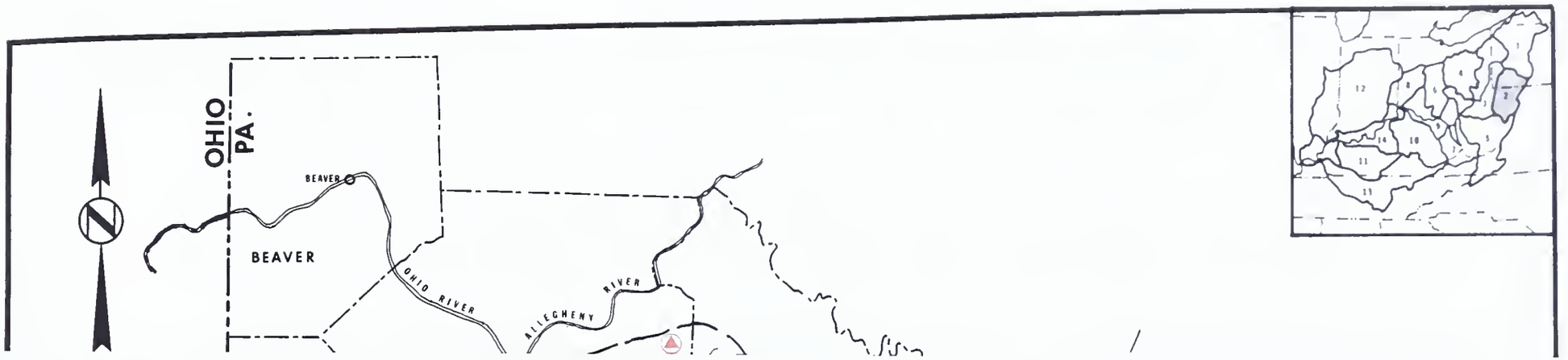
RECOMMENDED PROJECTS & PROGRAMS

Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE
10 0 10 20 Kilometers
10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO
1974


OHIO
PA.
BEAVER
BEAVER
OHIO RIVER
ALLEGHENY RIVER

OHIO
PA.
W. VA.
PA.
PA.
MD.
MD.
W. VA.

BEAVER
ALLEGHENY
WASHINGTON
GREENE
MONONGALIA
MARION
HARRISON
TAYLOR
BARBOUR
UPSHUR
RANDOLPH
POCAHONTAS
TUCKER
LEWIS
PRESTON
FAYETTE
WESTMORELAND
SOMERSET
GARRETT

BEAVER
PITTSBURGH
WASHINGTON
GREENSBURG
WAYNESBURG
UNIONTOWN
SOMERSET
MORGANTOWN
FAIRMONT
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PHILIPPI
PARSONS
WESTON
BUCKHANNON
ELKINS

OHIO RIVER
ALLEGHENY RIVER
MONONGAHELA RIVER
Youghiogheny River
Cheat River
Tygart Valley River
West Fork River
Buckhannon River
Middle Fork River
Tygart Lake
Deep Creek Lake
Dunkard Cr.
Ten Mile Cr.
Browns Cr.
Roll Cr.
South Fk.
Whiteley Cr.
Pau Pau Cr.
Buffalo Cr.
Booths Cr.
Tygart Valley
Three Fork
Sandy Cr.
Laurel Run
Taylor Cr.
Horseshoe Run
Blackwater
Pole Cr.
Stonecoal Cr.
Leading Creek
Otter Cr.
Dry Fk.
Red Creek
Shavers Fork
Glady Fk.
Laurel Creek
Candy Creek
Buckhannon
Right Fk.
Left Fk.
Bath Fk.
Mill Cr.
Tygart Valley
Indian Creek
Laurel Hill Cr.
Casselman River
Coxes Creek
Youghiogheny Res.
Saltlick Cr.
Big Sandy Cr.
Big Sandy Beaver Cr.
Muddy Creek
Paw Paw Cr.
Monongahela R.
Sandy Creek
Saltlick

660 658 597 569 678 537 639 612 538 616 646 679 642 574 556 610 645 601 551 683 897 571 614 543 579 893 641 621 535 667 586 598 604 648 629 578 942 665 608 594 644 631 682 603 649 563 607 669 617 687 638 654 568 555 643 547 572 670 655 566 664 654 639 619 640 635 653 558 536 626 673 581 565 534 553 672 561 567 539 599 663 551 676 621 562 575 590 623 633 618 667 546 582 692 606 625 592 595 652 570 656 560 584 602 681

WATER QUALITY CONTROL

▲ MINE DRAINAGE ABATEMENT PROJECT

RECOMMENDED
PROJECTS & PROGRAMS

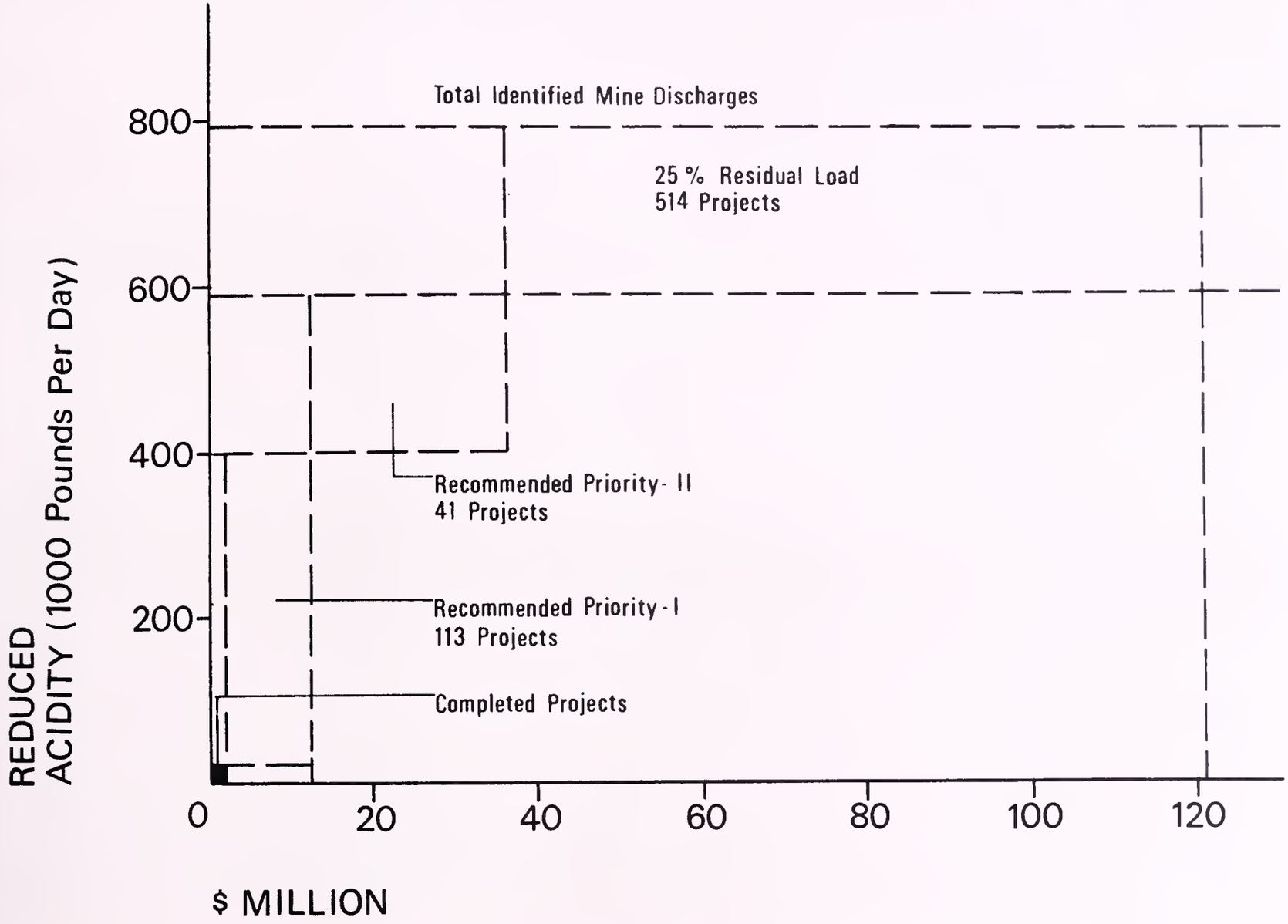
Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE
10 0 10 20 Kilometers
10 0 10 20 Miles

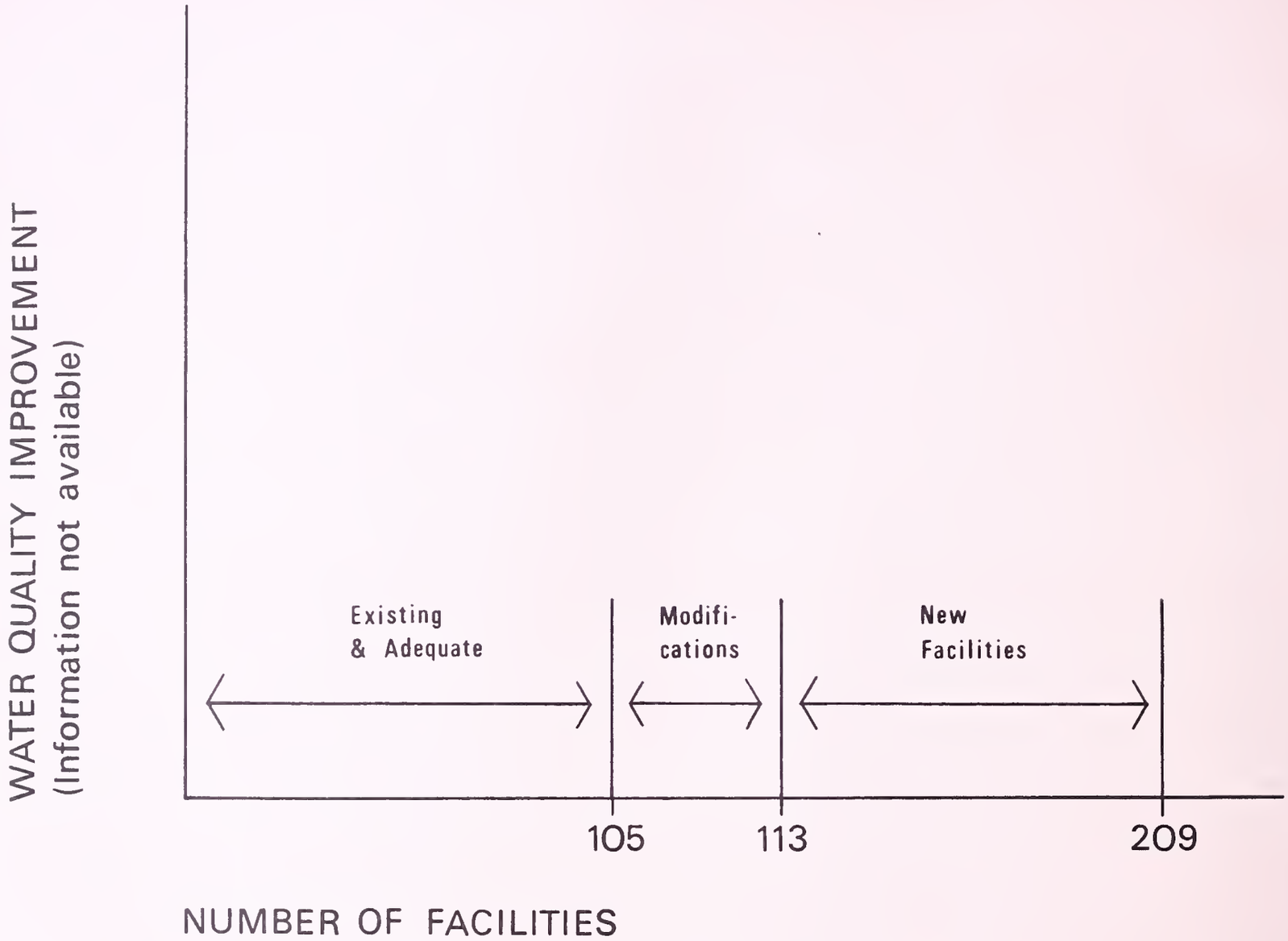
OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO
1974

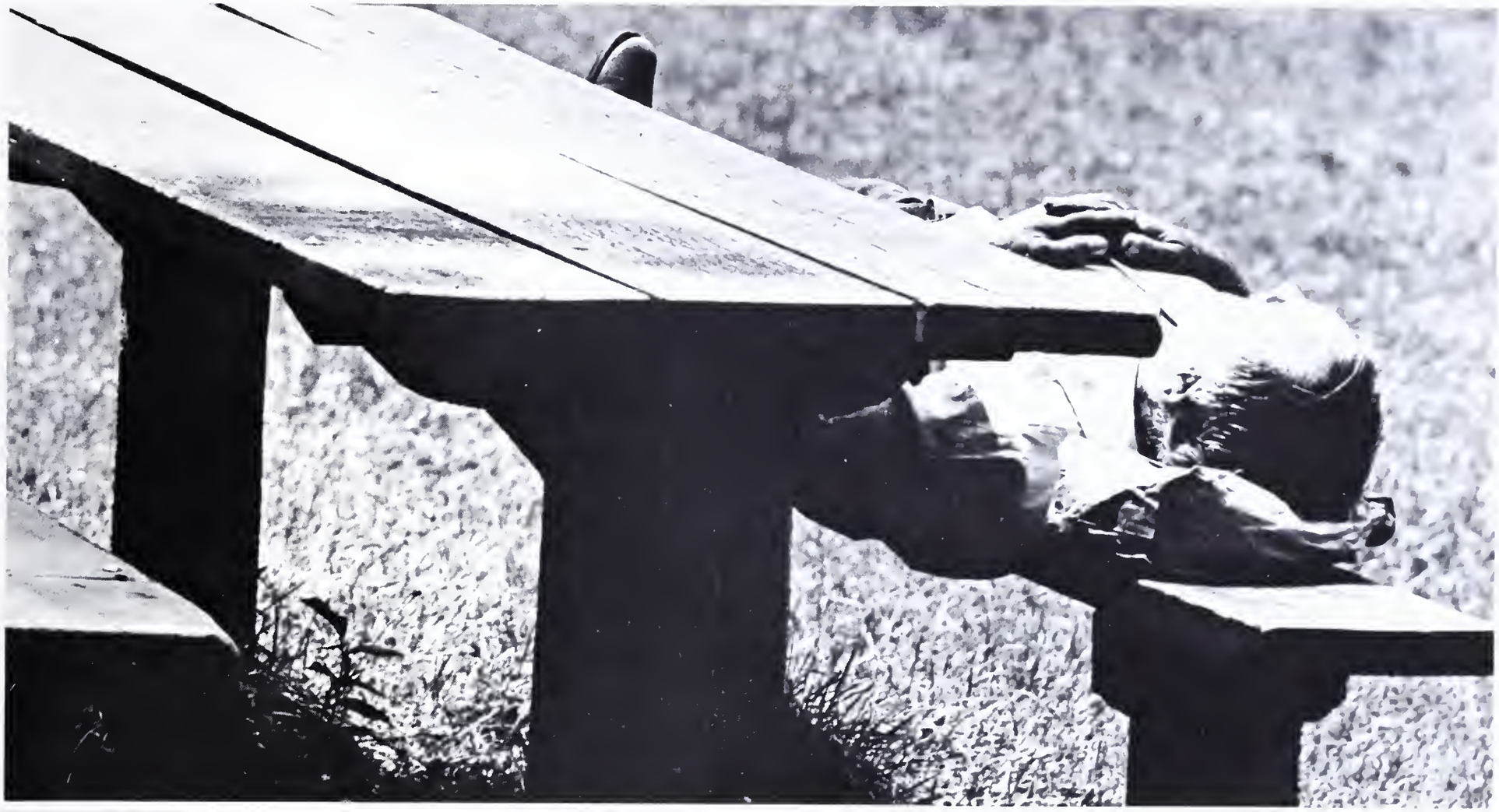
MONONGAHELA
ABANDONED MINE DRAINAGE ABATEMENT



NOTE - This chart is based on ARC Plan; there are additions from state plans.

MONONGAHELA DOMESTIC WASTE TREATMENT FACILITIES





Appendices

Comparison of Economic and Demographic Projections

The Monongahela study relied completely on existing information, and therefore, in no case were the needs or problems modified to reflect a new or different set of economic or demographic projections. The quality of these projections and the methodology employed were considered sufficient for this effort. In general it was found that there are more existing needs and problems which have not been adequately addressed than there are anticipated funds to provide for the solutions. For this reason, the study addressed existing needs and problems before considering projected needs and problems, and examined the scope of each recommendation to assure maximum utilization (considering projected growth) of resource commitments. Below is a subjective analysis by function of the potential effect if different projections had been used. Also, a set of tables and graphs shows a comparative display of projections for this area.

The following figures display Pittsburgh SMSA and Sub Area 502 projections developed for the Ohio River Basin Comprehensive Survey Appendix B (August 1964), the OBERS Series "C" Projections (1972), the OBERS Series "E" Projections (1972), State projections (as of June 1974), and the Southwestern Pennsylvania Regional Planning Commission projections (based on 1967 Survey Data and Cycle II Household Forecast). The Ohio River Basin Comprehensive Survey projections are essentially a "B" series, and therefore increase at a faster rate than the current OBERS "C" which are based on more recent data. The State and the Southwestern Regional Planning Commission (SRPC) projections are essentially identical except that the SRPC data do not include population for some institutions (e.g., hospitals or prisons). The SRPC data is being used in the Pennsylvania State Water Plan.

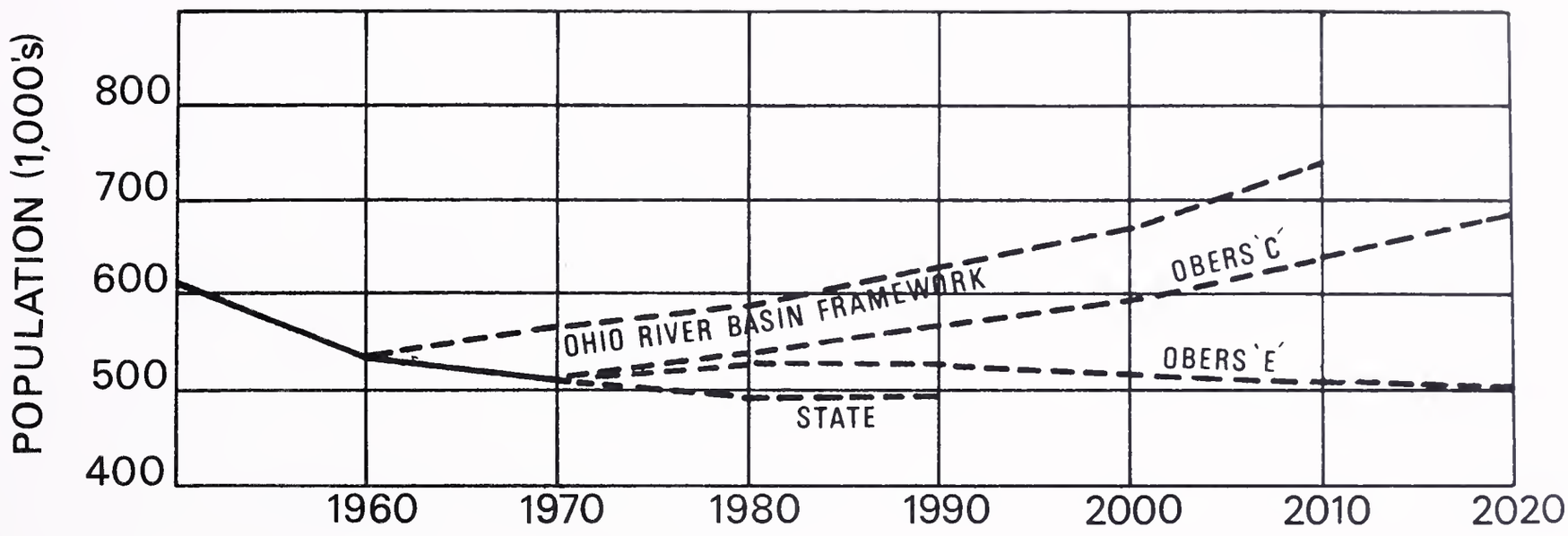
For flood damage abatement problems, the Plan Formulation Committee considered only the current average annual damages and not inflation or potential increased development in the flood plains. This is in recognition of the Flood Disaster Protection Act of 1973 (PL 93-234) which will regulate future flood plain development. Thus, the solutions for flood damage abatement are not relative to economic and demographic projections.

For waterborne transportation, only the existing situation and the historic trend of commodity transport were used. Economic and demographic projections were not applied directly because it was felt the historic trend generated the most realistic projections. The recommendations for improving and upgrading the Monongahela River waterway resulted from the need to eliminate existing bottlenecks. After making the decision to eliminate these bottlenecks the Plan Formulation Committee examined the efficiency of the locking size and selected sizes to meet the historic trend beyond 2020. Only the physical lock facilities will be increased to this capacity. Recommendations have not been made to augment the stream flow to support this amount of traffic, although augmentation may be required as discussed under the Transportation Section.

The water quality recommendations were developed by balancing existing and near term expected loads with the water quality standards at the 7 day/10-year low flow available in the streams. Effluents from increased industrial activity and municipal growth will have to fit within this overall balance and will be accounted for through the National Pollutant Discharge Elimination System (NPDES). The major water quality control problem in the Monongahela is acid mine drainage from abandoned mines. Economic and demographic projections are secondary to legislative mandates for water quality control.

For water supply, the municipal water consumptive use is somewhat sensitive to population projections. However, the incremental change in consumptive use based on each of the described projections is small compared to the resource available, and the recommendations would not be affected by using OBERS "E" versus OBERS "C" versus State Water Plan Projections. Considering current technology and the benchmark of maintaining the existing 7-day/10-year flow, the current available water supply along the Lower Monongahela prohibits the development of coal gasification or liquefaction facilities and new power plants using evaporative type cooling. However, there are no recommendations to increase the water supply for these energy related demands, as the requirements will be handled on an individual basis in the normal course of State or Federal withdrawal permit applications.

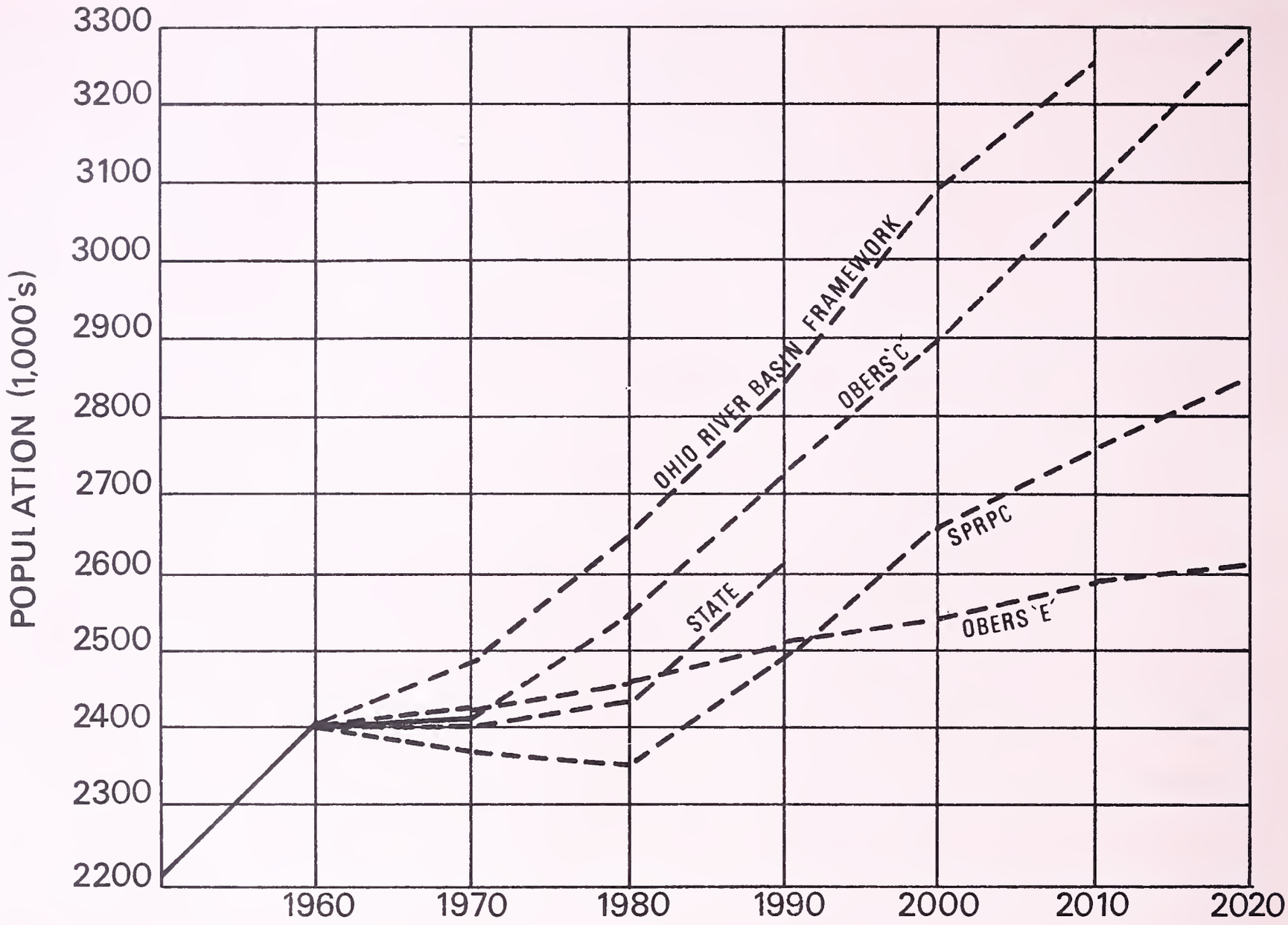
Peaking power requirements are not limited to the Monongahela Subregion, but result from FPC trendline projected demands in PSA 7 and beyond. With the transfer of electricity possible through



POPULATION PROJECTIONS, WATER RESOURCES SUBAREA
502-MONONGAHELA

the existing network of transmission lines, the demand could be met through pumped storage facilities within the Monongahela Basin or at other locations. Thus peaking power is not directly related to State or OBERS projections for this subregion.

The recreation recommendations are sensitive to the type of economic and demographic projections used. The demand for surface water recreation is based upon the State projections being used in the State Comprehensive Outdoor Recreation Plans and State Water Plans. These projections indicate a significant deficit in the future supply for the greater Pittsburgh area. Outside the Pittsburgh metropolitan area, existing recreation facilities are adequate in most areas to meet the demand. For the Pittsburgh area, it is not feasible to fulfill all of the demand, under any set of projections. The primary problem is that the average travel distance for a recreation experience is 50 miles and adequate major water resource recreation is not possible within this distance.



POPULATION PROJECTIONS,
PITTSBURGH STANDARD METROPOLITAN STATISTICAL AREA

Principles and Standards Analysis

The Monongahela Level B Study included an analysis in accordance with the Water Resources Council's Principles and Standards as published in the Federal Register of September 10, 1973. The primary portion of the analysis was made by the firm of Gannett, Fleming, Corddry and Carpenter, Inc., of Harrisburg, Pa. Their report, entitled "Monongahela River Basin Principles and Standards Analysis," December 1974, was used by the Plan Formulation Committee as a major input to the process of selecting the final recommended plan. Results of the analysis, including modifications made by the Plan Formulation Committee, are shown on the following table.

The tables in each functional section of this report display the recommended plan including whether or not an item is in the NED and EQ plans. A "Yes" or "No" under the NED or EQ column indicates that the project or program was considered viable for that plan. A theoretical plan would include almost all of the alternatives not selected.

The general process followed in the Principles and Standards Application was as follows:

1. Over 1,000 potential projects and programs were examined to meet the needs and problems of the Monongahela River Basin. Accounting sheets displaying project and program information and beneficial and adverse effects were completed for most of these alternatives. The majority of these projects and programs were eliminated because of failure to meet an urgent need or problem, overriding environmental concerns, or a lack of public interest.

2. After this first screening process, a second list of projects which had promising potential but still lacked sufficient detailed information were recommended for preliminary investigation. These recommendations were not included under any plan or account of the Principles and Standards.

3. The remaining projects and programs were selected for the NED and/or EQ plans based on how well the project or program met the objective of each plan. Information on all four accounts was completed for all of these projects and account summaries for each plan were prepared.

4. From the projects included in the NED and EQ plans, a Recommended Alternative (RA) plan was developed. The RA plan included only those projects recommended for Priority Group I implementation. Other projects contained in the NED and EQ plans were recommended for detailed planning only, placed in Priority Group II, shifted to an action pending category, or deleted from further consideration.

5. Policy decisions for inclusion (yes) in the NED or EQ plan are listed below, unless already clear in the Federal Register.

   - Projects and programs with significant net recreation benefits were placed in both the NED and EQ plans.
   - Wild and scenic rivers, in addition to being in the EQ plan, were given a "Yes" under the NED plan because of recreation benefits and increased property values of adjacent land. Development opportunities foregone were not estimated.
   - Flood plain information studies were included in both the NED and EQ plans. Under the NED plan, these studies (supported by insurance and zoning) would help to eliminate unwise development in the flood plain, thereby reducing flood damages. Restricting flood development in the flood plain would reduce the possibility of having residual damage and unrepaired structures following a flood, thus enhancing the surrounding property values. The restriction of the flood plain to primarily open space or agricultural uses would have a positive environmental effect.
   - Municipal waste treatment and mine drainage abatement were included with a "Yes" under both the NED and EQ plans. The environmental consideration is obvious and the improved water quality would have a beneficial effect under the NED plan by providing a clean water supply for recreation, fish and wildlife, and municipal and industrial uses.
   - The decision for wild and scenic rivers, flood plain identification, and pollution abatement were made by the Plan Formulation Committee following completion of the contractor's report.

6. General policy for selecting the RA plan included:

   - A project or program with a "Yes" in both the NED and EQ plans was put in the RA plan.
   - An item with a "No" under both the NED and EQ plans was omitted from the RA plan.
   - An item with a "Yes" under NED and a "No" under EQ would go in the RA plan if there were no major adverse environmental effects.
   - An item with a "No" under NED and "Yes" under EQ would go in the RA plan if there were no severe adverse economic effects.

SIGNIFICANT IMPACTS:

	ENVIRONMENTAL QUALITY ACCOUNT	NATIONAL ECONOMIC DEVELOP. ACCOUNT	REGIONAL DEVELOP. ACCOUNT	SOCIAL WELL-BEING ACCOUNT
BENEFICIAL EFFECTS	Create over 4,300 acres of flat water lakes. Create beach and shore areas. Protect and enhance Youghiogheny River. Preserve flora and fauna of Sinks of Gandy. Provide for increased funding for mine drainage abatement, and State Enforcement programs for active mines and industrial discharges. Reclamation requirements for coal prospecting. Sediment reduction in excess of 72,000 tons annually for one project; additional reduction for another 2 projects. Low flow augmentation by 3 projects. Water Quality Improvement from 104 domestic sewage facilities, 130 orphan mine drainage projects. Provide Flood zoning and insurance at 13 locations. Reduce erosion by land stabilization (2 watershed projects). Preserve groundwater resources for future with 3 surface water projects.	Total quantifiable benefits include $12.3 million annual benefits. Of the 23 projects/ programs in the RA plan, 4 had quantifiable beneficial effects. Quantification is not available for the majority of beneficial effects, for example, reduction of national transportation costs. NOTE: Annual costs and benefits in the RA Plan for 104 domestic sewage projects, 113 mine drainage abatement projects, and 13 flood plain zoning programs and insurance were not included.	Quantification not available; majority of recreation, and external benefits will occur outside of basin; majority of water quality benefits will occur within basin. Increased industrial and recreational activities generated by 18 water resource projects should result in both short-term and long-term jobs; large percentage of construction employment may not benefit basin residents. Likely long-term relative gain in less populated areas of basin, based on attraction from outside and shifts from populated areas within basin. Improved economic stability, including wider range of economic activities and other aspects of local infrastructure resulting from higher tax revenue and broader tax base. Improved tax base, including new business attraction by available power, water supply, flood control, and water transport. Combined effects of 104 domestic sewage treatment facilities and 130 orphan mine drainage abatement projects. Provide Flood zoning and insurance at 13 locations.	Low to medium income jobs projected as a result of 20 projects, many of the jobs will be short-term; auxiliary enterprises induced by the EQ Plan may provide long-term jobs for underemployed or unemployed wage earners. Provide flood protection or prevention by 12 projects. Reduce drought risk by 10 projects. Reduce exposure to pollution by 104 domestic sewage facilities and 171 orphan mine drainage abatement projects. Provide Flood zoning and insurance for all portions of the Basin not now covered. Provide opportunities for 1,800,000 annual visitor days of recreation at 5 projects; unquantified benefits at 23 projects. Addition of 3,800 recreational water acres. Increased access to recreational water. Provision of flexible reserves of water supply.
ADVERSE EFFECTS	Inundate more than 4300 acres of open and green space. Inundate reach of potential scenic river in Cheat Drainage Basin. Disrupt over 55 miles of channel. Disturb over 18 archeological sites. Considerable habitat inundated or disturbed. Some losses in wildlife habitat. Permanent inundation of archeological sites and historical resources.	Total quantifiable adverse effects include $10.2 million annual costs. Of the 23 projects/programs in the RA plan, 4 had quantifiable annual costs. Total cost of the RA plan, total capital expenditures plus study cost is approximately $448.5 million. There are some unquantified costs.	Quantification not available; majority of capital expenditures will originate external from basin; some losses outside of basin associated with external diseconomies and some losses to basin from external diseconomies. Some loss from activities displaced by construction of 3 water resource projects. Short-term reduction in tax revenue by shift to public ownership. Loss of farm produce, timber harvesting, and mining activities. Improved navigation services and general economic stimulus may increase industrial and recreational activities with resulting adverse effects on air, land, and water quality.	Distribution of project induced wealth may worsen relative status of low income groups. Increased roadway traffic, litter, congestion and fire hazard caused by recreational use of twenty-four projects. Increased hazards to recreational use of Monongahela River through greater commercial traffic induced by two navigation projects. Disruption to infrastructure by family relocation.

SUMMARY COMPARISON OF NATIONAL ECONOMIC DEVELOPMENT, ENVIRONMENTAL QUALITY AND RECOMMENDED ALTERNATIVE PLANS FOR THE MONONGAHELA BASIN

NATIONAL ECONOMIC DEVELOPMENT ACCOUNT:

	NED PLAN	RA PLAN	EQ PLAN
TOTAL BENEFICIAL EFFECTS	Total quantifiable benefits include $26.6 million annual benefits. Of the 72 projects/programs in the NED plan, 17 had quantifiable beneficial effects. Quantification is not available for the majority of beneficial effects.	Total quantifiable benefits include $12.3 million annual benefits. Of the 23 projects/programs in the RA plan, 4 had quantifiable beneficial effects. Quantification is not available for the majority of beneficial effects.	Total quantifiable benefits include $7.7 million annual benefits. Of the 61 projects/programs in the EQ plan, 12 had quantifiable beneficial effects. Quantification is not available for the majority of beneficial effects.
TOTAL ADVERSE EFFECTS	Total quantifiable adverse effects include $19.8 million annual costs. Of the 73 projects/programs in the NED plan, 17 had quantifiable annual costs. Total cost of the NED plan, total capital expenditures plus study cost, is approximately $790.8 million. There are some unquantified costs.	Total quantifiable adverse effects include $10.2 million annual costs. Of the 23 projects/programs in the RA plan, 4 had quantifiable annual costs. Total cost of the RA plan, total capital expenditures plus study cost is approximately $448.5 million. There are some unquantified costs.	Total quantifiable adverse effects include $6.0 million annual costs. Of the 62 projects/programs in the EQ plan, 12 had quantifiable annual costs. Total cost of the EQ plan, total capital expenditures plus study cost, is approximately $428.0 million. There are some unquantified costs.
NET BENEFICIAL EFFECTS	Quantifiable net annual beneficial effects exceed $6.8 million. Quantifications are not available for the majority of effects.	Quantifiable net annual beneficial effects exceed $2.1 million. Quantifications are not available for the majority of effects.	Quantifiable net annual beneficial effects exceed $81.7 million. Quantifications are not available for the majority of effects.

NOTE: Annual costs and benefits in the RA Plan for 104 domestic sewage projects, 113 mine drainage abatement projects, and 13 flood plain zoning and insurance programs were not included.

ENVIRONMENTAL QUALITY ACCOUNTS:

BENEFICIAL EFFECTS	NED PLAN	RA PLAN	EQ PLAN
A. Protection, Enhancement, and Creation of Areas of Natural Beauty.	Create over 22,000 acres of flat water lakes.	Create over 4,300 acres of flat water lakes.	Create over 7,140 acres of flat water lakes.
	Create beach and shore areas.	Create beach and shore areas.	Create beach and shore areas.
	Protect and Enhance Youghiogheny, Casselman, Cheat, Middle Fork, and Shavers Fork Rivers.	Protect and Enhance Youghiogheny River.	Protect unique mountain and wilderness area in Cheat Basin.
	Creation of Piney Mountain State Park.		Creation of Piney Mountain State Park.
			Further protection of Cranesville Swamp.
			Protect and Enhance Middle Fork, Youghiogheny, Casselman, Cheat & Shavers Fork Rivers.
B. Preservation and Enhancement of Archeological, Historical, Biological, Geological Resources and Selected Ecological Systems.	Provide rest area for migratory water fowl, create habitat for warm water fish.	Preserve flora and fauna of Sinks of Gandy.	Provide rest area for migratory water fish.
			Preserve flora and fauna of Dolly Sods, Sinks of Gandy, and Canaan Valley.
			Preserve unique habitat and breeding area, including Canaan Valley Area.
	Recommendation to provide for increased funding for mine drainage abatement, and State Enforcement programs for active mines and industrial discharges.	Recommendation to provide for increased funding for mine drainage abatement, and State Enforcement programs for active mines and industrial discharges.	Recommendation to provide for increased funding for mine drainage abatement, and State Enforcement programs for active mines and industrial discharges.
	Reclamation requirements for coal prospecting.	Reclamation requirements for coal prospecting.	Reclamation requirements for coal prospecting.
C. The Quality of Water, Land, and Air Resources.	Sediment reduction in excess of 72,000 tons annually for one project; additional reduction for another 13 projects.	Sediment reduction in excess of 72,000 tons annually for one project; additional reduction for another 2 projects.	Sediment reduction in excess of 4,000 tons from 4 projects, additional reduction for 9 projects.
	Low flow augmentation by 3 projects.	Low flow augmentation by 3 projects.	Low flow augmentation by 1 project.
	Water Quality Improvement from 104 domestic sewage facilities, 171 orphan mine drainage projects.	Water Quality Improvement from 104 domestic sewage facilities, 130 orphan mine drainage projects.	Water Quality Improvement from 104 domestic sewage facilities, 171 orphan mine drainage projects.
	Provide Flood zoning and insurance for all portions of the Basin not now covered.	Provide Flood zoning and insurance at 13 locations.	Provide Flood zoning and insurance for all portions of the Basin not now covered.
D. Irreversible or Irretrievable Commitment of Resources.	Reduce use of fossil fuel (2 projects).	Reduce erosion by land stabilization (2 watershed projects).	Reduce erosion by land stabilization (13 projects).
	Reduce erosion by land stabilization (15 watershed projects).		
	Preserve groundwater resources for future with 5 surface water projects.	Preserve groundwater resources for future with 3 surface water projects.	Preserve groundwater resources with 5 surface water projects.
	Preserve scarce fossil and nuclear fuels by hydropower development.		

ADVERSE EFFECTS	NED PLAN	RA PLAN	EQ PLAN
A. Protection, Enhancement, and Creation of Areas of Natural Beauty.	Inundate more than 22,000 acres of open and green space.	Inundate more than 4300 acres of open and green space.	Inundate more than 7,140 acres of open and green spaces.
	Inundate reach of potential scenic river in Cheat Drainage Basin.	Inundate reach of potential scenic river in Cheat Drainage Basin.	Disrupt over 55 miles of channel.
	Inundate shoreline by two navigation projects.	Disrupt over 55 miles of channel.	Increased inundation of land if Federal Government allowed to finance Water Supply in major reservoirs.
	Disrupt over 62 miles of channel.		
B. Preservation and Enhancement of Archeological, Historical, Biological, Geological Resources, and Selected Ecological Systems.	Disturb 50 archeological sites.	Disturb over 18 archeological sites.	Disturb over 18 archeological sites.
	Possible disturbance of historical sites.	Possible disturbance of historical sites.	Possible disturbance of historical sites.
	Considerable habitat inundated or disturbed.	Considerable habitat inundated or disturbed.	Considerable habitat inundated or disturbed.
	Disturb ecological systems during construction.	Disturb ecological systems during construction.	Disturb ecological systems during construction.
C. The Quality of Water, Land and Air Resources.	Increase in erosion and sedimentation during construction of 39 projects.	Increase in erosion and sedimentation during construction of 16 projects.	Increase in erosion and sedimentation during construction of 20 projects.
	Temporary increase in air and noise pollution during construction.	Temporary increase in air and noise pollution during construction.	Pollution caused by increased commercial, industrial, and recreational activities.
	Increase in congestion, traffic, and litter resulting from increased land use.	Increase in congestion, traffic, and litter resulting from increased land use.	Temporary increase in air and noise pollution during construction.
	Possible increase in flood plain land use.		Increase in congestion, traffic, and litter resulting from increased land use.
		Possible increase in flood plain land use.	Possible increase in flood plain land use.
D. Irreversible or Irretrievable Commitment of Resources.	Some losses to tranquility of rural environment, particularly Canaan Valley.	Some losses to tranquility of rural environment.	Some losses to tranquility of rural environment and general losses in wildlife habitat.
	General losses in wildlife habitat, particularly Canaan Valley	Some losses in wildlife habitat.	Permanent inundation of archeological sites and historical resources.
	Permanent inundation of archeological sites and historical resources.	Permanent inundation of archeological sites and historical resources.	

REGIONAL DEVELOPMENT ACCOUNT:

(REGIONAL INCOME)

	NED PLAN	RA PLAN	EQ PLAN
BENEFICIAL EFFECTS	Quantification not available; majority of power, recreation, and external economies benefits will occur outside of basin; majority of water quality benefits will occur within basin.	Quantification not available; majority of recreation and external benefits will occur outside of basin; majority of water quality benefits will occur within basin.	Quantification not available; majority of recreation and external economies benefits will occur outside of basin; majority of water quality benefits will occur within basin.
ADVERSE EFFECTS	Quantification not available; majority of capital expenditures will originate external from basin; some losses outside of basin associated with external diseconomies and some losses to basin from external diseconomies.	Quantification not available; majority of capital expenditures will originate external from basin; some losses outside of basin associated with external diseconomies and some losses to basin from external diseconomies.	Quantification not available; majority of capital expenditures will originate external from basin; some losses outside of basin associated with external diseconomies and some losses to basin from external diseconomies.
NET BENEFICIAL EFFECTS			

REGIONAL DEVELOPMENT ACCOUNT:

(REGIONAL EMPLOYMENT)

	NED PLAN	RA PLAN	EQ PLAN
BENEFICIAL EFFECTS	Increased industrial and recreational activities generated by 39 water resource projects should result in both short-term and long-term jobs; large percentage of construction employment may not benefit basin residents.	Increased industrial and recreational activities generated by 18 water resource projects should result in both short-term and long-term jobs; large percentage of construction employment may not benefit basin residents.	Increased industrial and recreational activities generated by 30 water resource projects should result in both short-term and long-term jobs; large percentage of construction employment may not benefit basin residents.
ADVERSE EFFECTS	Some loss from activities displaced by construction of 13 water resource projects.	Some loss from activities displaced by construction of 3 water resource projects.	Some loss from activities displaced by construction of 18 water resource projects.

REGIONAL DEVELOPMENT ACCOUNT:

(POPULATION DISTRIBUTION)

	NED PLAN	RA PLAN	EQ PLAN
BENEFICIAL EFFECTS	Likely long-term relative gain in less populated areas of basin, based on attraction from outside and shifts from populated areas within basin.	Likely long-term relative gain in less populated areas of basin, based on attraction from outside and shifts from populated areas within basin.	Likely long-term relative gain in less populated areas of basin, based on attraction from outside and shifts from populated areas within basin.
ADVERSE EFFECTS	Some loss from activities displaced by construction of 13 water resources projects.	Some loss from activities displaced by construction of 3 water resource projects.	Some loss from activities displaced by construction of 18 water resource projects.

REGIONAL DEVELOPMENT ACCOUNT:

(REGIONAL ECONOMIC BASE AND STABILITY)

	NED PLAN	RA PLAN	EQ PLAN
BENEFICIAL EFFECTS	Improved economic stability, including wider range of economic activities and other aspects of local infrastructure resulting from higher tax revenue and broader tax base.	Improved economic stability, including wider range of economic activities and other aspects of local infrastructure resulting from higher tax revenue and broader tax base.	Improved economic stability, including wider range of economic activities and other aspects of local infrastructure resulting from higher tax revenue and broader tax base.
	Improved tax base including new business attraction by available power, water supply, flood control, and water transport.	Improved tax base, including new business attraction by available power, water supply, flood control, and water transport.	Improved tax base including new business attraction by available water supply, pollution and flood control.
	Increased opportunity for water supply.		
ADVERSE EFFECTS	Short-term reduction in tax revenue by shift to public ownership.	Short-term reduction in tax revenue by shift to public ownership.	Short-term reduction in tax revenue by shift to public ownership.
	Loss of farm produce, timber harvesting, and mining activities.	Loss of farm produce, timber harvesting, and mining activities.	Loss of farm produce, timber harvesting, and mining activities.

REGIONAL DEVELOPMENT ACCOUNT:

(ENVIRONMENTAL CONDITIONS OF SPECIAL REGIONAL CONCERN)

	NED PLAN	RA PLAN	EQ PLAN
BENEFICIAL EFFECTS	Combined effects of 104 domestic sewage treatment facilities and 171 orphan mine drainage abatement projects.	Combined effects of 104 domestic sewage treatment facilities and 130 orphan mine drainage abatement projects.	Combined effects of 104 domestic sewage treatment facilities and 171 orphan mine drainage abatement projects.
		Portion of the unique rural tranquility and wildlife habitat of the Cheat Basin will be preserved by Gandy Sinks.	The unique rural tranquility and wildlife habitat of the Cheat Basin will be preserved by Dolly Sods, Gandy Sinks, and Canaan Valley projects, and legislation.
	Provide Flood zoning and insurance for all portions of the Basin not now covered.	Provide Flood zoning and insurance at 13 locations.	Provide Flood zoning and insurance for all portions of the Basin not now covered.
ADVERSE EFFECTS	Improved navigation services and general economic stimulus may increase industrial and recreational activities with resulting adverse effects on air, land, and water quality.	Improved navigation services and general economic stimulus may increase industrial and recreational activities with resulting adverse effects on air, land, and water quality.	
	Unique rural tranquility and wildlife habitat of the Cheat Drainage Basin, including Canaan Valley will be profoundly altered by NED projects.		

SOCIAL WELL-BEING ACCOUNT:

BENEFICIAL EFFECTS

	NED PLAN	RA PLAN	EQ PLAN
A. Real Income Distribution	Low to medium income jobs projected as a result of 39 projects, many of the jobs will be short-term; auxiliary enterprises induced by the NED Plan may provide long-term jobs for underemployed or unemployed wage earners.	Low to medium income jobs projected as a result of 16 projects, many of the jobs will be short-term; auxiliary enterprises induced by the RA Plan may provide long-term jobs for underemployed or unemployed wage earners.	Low to medium income jobs projected as a result of 20 projects, many of the jobs will be short-term; auxiliary enterprises induced by the EO Plan may provide long-term jobs for underemployed or unemployed wage earners.
B. Life, Health, Safety	Provide flood protection or prevention by 17 projects.	Provide flood protection or prevention by 4 projects.	Provide flood protection or prevention by 12 projects.
	Reduce drought risk by 13 projects.	Reduce drought risk by 4 projects.	Reduce drought risk by 10 projects.
	Reduce exposure to pollution by 104 domestic sewage facilities and 171 orphan mine drainage abatement projects.	Reduce exposure to pollution by 104 domestic sewage facilities and 130 orphan mine drainage abatement projects.	Reduce exposure to pollution by 104 domestic sewage facilities and 171 orphan mine drainage abatement projects.
	Provide Flood zoning and insurance for all portions of the Basin not now covered.	Provide Flood zoning and insurance at 13 locations.	Provide Flood zoning and insurance for all portions of the Basin not now covered.
C. Education, Cultural and Recreational Opportunities	Provide opportunities for 2,370,000 annual visitor days of recreation at 8 projects; unquantified benefits at 28 other projects.	Provide opportunities for 1,615,000 annual visitor days of recreation at 2 projects; unquantified benefits at 10 other projects.	Provide opportunities for 1,800,000 annual visitor days of recreation at 5 projects; unquantified benefits at 23 projects.
	Addition of 20,000 recreational water acres.	Addition of 3,000 recreational water acres.	Addition of 3,800 recreational water acres.
	Provide opportunities for utilities, schools, hospital, and other services through tax revenue generated by 39 projects.	Provide opportunities for utilities, schools, hospital, and other services through tax revenue generated by 16 projects.	Provide opportunities for utilities, schools, hospital, and other services through tax revenue generated by 26 projects.
	Increased access to recreational water.	Increased access to recreational water.	Increased access to recreational water.
D. Emergency Preparedness	Maintenance of national waterway system by 5 navigation projects.	Maintenance of national waterway system by 2 navigation projects.	
	Provision of flexible reserves of water supply.	Provision of flexible reserves of water supply.	Provision of flexible reserves of water supply.
	Conservation of scarce fuel supplies.	Conservation of scarce fuel supplies.	
	Provision of power supplies.	Provision of power supplies.	
	Encourage dispersal of population and industry.	Encourage dispersal of population and industry.	Encourage dispersal of population and industry.
	Provision for continuity of roadway service.	Provision for continuity of roadway service.	Provision for continuity of roadway service.
	Provision for fire protection.	Provision for fire protection.	Provision for fire protection.

SOCIAL WELL-BEING ACCOUNT:

ADVERSE EFFECTS	NED PLAN	RA PLAN	EQ PLAN
A. Real Income Distribution	Distribution of project induced wealth may worsen relative status of low income groups.	Distribution of project induced wealth may worsen relative status of low income groups.	Distribution of project induced wealth may worsen relative status of low income groups.
B. Life Health, Safety	Increased safety hazard during construction of 39 projects.	Increased safety hazard during construction of 16 projects.	Increased safety hazard during construction of 20 projects.
	Increased roadway traffic, litter, congestion and fire hazard caused by recreational use of eighteen projects.	Increased roadway traffic, litter, congestion and fire hazard caused by recreational use of twenty-four projects.	Increased roadway traffic, litter, congestion and fire hazard caused by recreational use of twenty-eight projects.
	Increased hazards to recreational use of Monongahela River through greater commercial traffic induced by two navigation projects.	Increased hazards to recreational use of Monongahela River through greater commercial traffic induced by two navigation projects.	
C. Educational, Cultural, and Recreational Opportunities	Short-term burden on facilities by temporary population influx during construction of 39 water resource projects.	Short-term burden on facilities by temporary population influx during construction of 16 water resource projects.	Short-term burden on facilities by temporary population influx during construction of 20 water resource projects.
	Disruptions to community infrastructure by family relocation.	Disruption to infrastructure by family relocation.	Disruption to community infrastructure by family relocation.
D. Emergency Preparedness	Interruption of waterway transport during construction of two navigation projects.	Interruption of waterway transport during construction of two navigation projects.	Interruption of waterway transport during construction of two navigation projects.
	Risk of interrupted utilities and roadway services during construction of 39 projects.	Risk of interrupted utilities and roadway services during construction of 16 projects.	Risk of interrupted utilities and roadway services during construction of 20 projects.

Environmental Impact of the Monogahela Study

This Environmental Impact Statement (EIS) follows Section 102(2)(c) of the National Environmental Policy Act of 1969. It is based on the Ohio River Basin Commission's recommended plan (Level B) for Priority Group I (0 to 5 years) implementation for the Monongahela River Basin. More detailed EIS's will be prepared at the detailed planning or Level C stage.

a. **Requirement (i) "The environmental impact of the proposed action."**

The measures in the plan would provide varying degrees of flood protection to urban and rural areas in the basin. This protection of flood plain land would reduce the threat to life and property, provide for more efficient use of the land, thereby increasing the income of the property owners and the standard of living for the residents. In some instances this increase in income should result in improved cultural and aesthetic values. In addition, the reduction of flooding would reduce the vector, sanitation, and other health problems associated with flood flows.

The land-treatment measures proposed in the plan and accompanying land-use changes would result in decreased erosion, reduced stream and reservoir pollution caused by sediment, improved upland wildlife habitat, improved scenic attractiveness, and increased income of low-income landowners allowing further rural, aesthetic, and cultural improvements.

The augmentation of stream flows resulting from Stonewall Jackson Reservoir would increase the dependable capacity of the Monongahela River. The combination of the municipal waste treatment program, the abandoned mine drainage abatement program, and suggested legislative measures would improve the water quality levels. In addition, the proposed projects and programs would improve stream quality by reducing sediment and turbidity. Improved water quality would provide more favorable conditions for fish and wildlife enhancement and for general recreational use of the streams. All users would enjoy improved aesthetics, cleaner waters, and an improved public health environment. Development of the plan would provide an additional water surface which could be used for recreational purposes. Project-acquired lands at reservoir sites that are not required for

Recommendation for reclaiming orphan mines will provide a major benefit to environmental quality.

primary purposes would provide additional areas for upland game and waterfowl management for lease to State game and fish agencies and use by the general public.

These same waters and lands would provide the setting for bird watching, nature study, and associated activities.

Nonstructural measures adopted by the Commission are necessary for a well balanced plan for the basin. Along with other nonstructural measures included in the plan, protection and preservation of unique and scenic environmental areas associated with the basin streams would provide additional opportunities for nature study and recreation throughout the basin. The land acquisition recommendations could have a substantial beneficial impact in that scenic areas would be preserved and would be open for use by the people.

Significant Impacts

(1) Beneficial:

- Creation of 4,376 acres of flatwater lakes which would provide habitat for warm water fish and 1,615,000 annual visitor days.
- Preservation of flora, fauna, and geologic significance of the Sinks of Gandy.
- Sediment reduction in excess of 72,000 tons annually from one project; additional reduction from two other projects.
- Improved water quality through low flow augmentation from Stonewall Jackson Lake.
- Improved water quality from 104 domestic sewage facilities and 130 orphan mine projects.
- $12.3 million annual benefits; quantification not available for all benefits.
- Increased industrial and recreational activities generated by one watershed project, one major reservoir, and two water supply facilities.
- Long-and-short-term jobs from the above.
- Flood protection from one watershed project, one major reservoir, and four local protection projects.
- Reduced drought risk by four projects.
- Reduced exposure to pollution.
- Increased access to recreation water.

(2) Adverse:

- Spending of $448.5 million total capital costs for the proposed projects; there are some unquantified costs.
- Inundation of approximately 4,376 acres of open and green space in a basin of 4.5 million acres.
- Disruption of 55 miles of natural stream channel by four projects out of 11,000 miles total in the basin.
- Disruption of natural environment by users of recreation facilities.
- $10.2 million annual costs; quantification not available for all costs.
- Possible loss of 2,650 acres of coal resources and associated jobs.
- Loss of land from the tax rolls.
- Short-term: increased safety hazards from project construction and burden on facilities by temporary population influx.

b. **Requirement (ii) "Any adverse environmental effects which cannot be avoided should the proposal be implemented."**

Unavoidable effects include the disruption of 55 miles of free flowing stream reaches at impoundment sites; the loss of wildlife habitat due to reservoir construction; and the loss of 400 acres of forest, 1,800 acres of cropland, 1,530 acres of pasture, and rural residential lands at impoundment sites. Although major reservoir and upstream impoundment sites are generally located in sparsely populated areas, the relocation of people would be a short-term adverse environmental effect. Also, the proposed stream channel modifications would have adverse effects on stream fishery, wildlife, and aesthetics.

c. **Requirement (iii) "Alternatives to the proposed actions."**

The alternatives selected for implementation status in the plan were judged by the Plan Formulation Committee to be the best possible solution based upon consideration of benefits, costs, environmental impacts, demands, and public opinion.

(1) Alternatives to Stonewall Jackson Reservoir:

- Upstream reservoirs and watershed treatment.
- Local flood protection.
- Flood proofing.
- Flood plain zoning and insurance.
- Restricted municipal and industrial water usage.
- Recreation development at other facilities; improved programs; transfer of demand.
- No action.

(2) Alternatives to Elk Creek PL-566 Project:

- Major reservoir.
- Local flood protection.
- Flood proofing.
- Flood plain zoning and insurance.
- Recreation development at other facilities; improved programs; transfer of demand.
- No action.

(3) Alternatives to local protection projects:

- Flood proofing.
- Flood plain zoning and insurance.
- No action.

(4) Alternatives to water supply projects:

- Restricted municipal and industrial water usage.
- No action.

(5) Alternatives to domestic sewage facilities and orphan mine drainage abatement projects.

- No action.

(6) Alternatives to Sinks of Gandy and facility improvements to Pennsylvania State Parks:

- No action.

(7) Alternatives to three legislative actions:

- No action.

d. **Requirement (iv) "The relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity."**

The water resources management plan of the basin is considered to be a continuing program incorporating short-term management proposals and longer-term alternatives and guidelines for satisfying water related needs. Proper land use is a key element for efficiently maintaining a desirable relationship between environmental well-being and economic well-being. The use of land for water management purposes as outlined by the plan

should have few undesirable long-term implications for the people of the basin, its related service areas, and the Nation. The major compromise will be the inundation of 1,800 acres of cropland, 1,530 acres of pasture, 400 acres of woodland, and the disruption of approximately 35 miles of natural stream channel. However, the water resource management program would improve the long-term potential for the economic well-being of many people who presently have low average incomes, as well as furnishing support for economic activity in the more developed areas by providing the means to achieve satisfactory stream water quality and flood control.

The environmental well-being of people would be improved by the water related recreational and water quality aspects of the plan. Long-term losses to the existing natural environment would occur; the primary effects would be borne by the widespread common components of the existing natural environment such as hardwood forests and associated habitat. The existing ecological situation at reservoir sites would be replaced by the ecological system associated with freshwater lakes. Utilization of available project lands for wildlife management purposes is expected to compensate for project-induced wildlife losses. Land use for proposed recreation developments would be a suitable short-and long-term use for satisfying needs, and the negative impacts of this use on the environment can be minimized by planning and management. The land treatment and sediment control features of the plan would improve the basic capability of the land resource and the water courses for long-term use.

e. **Requirement (v) "Any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented."**

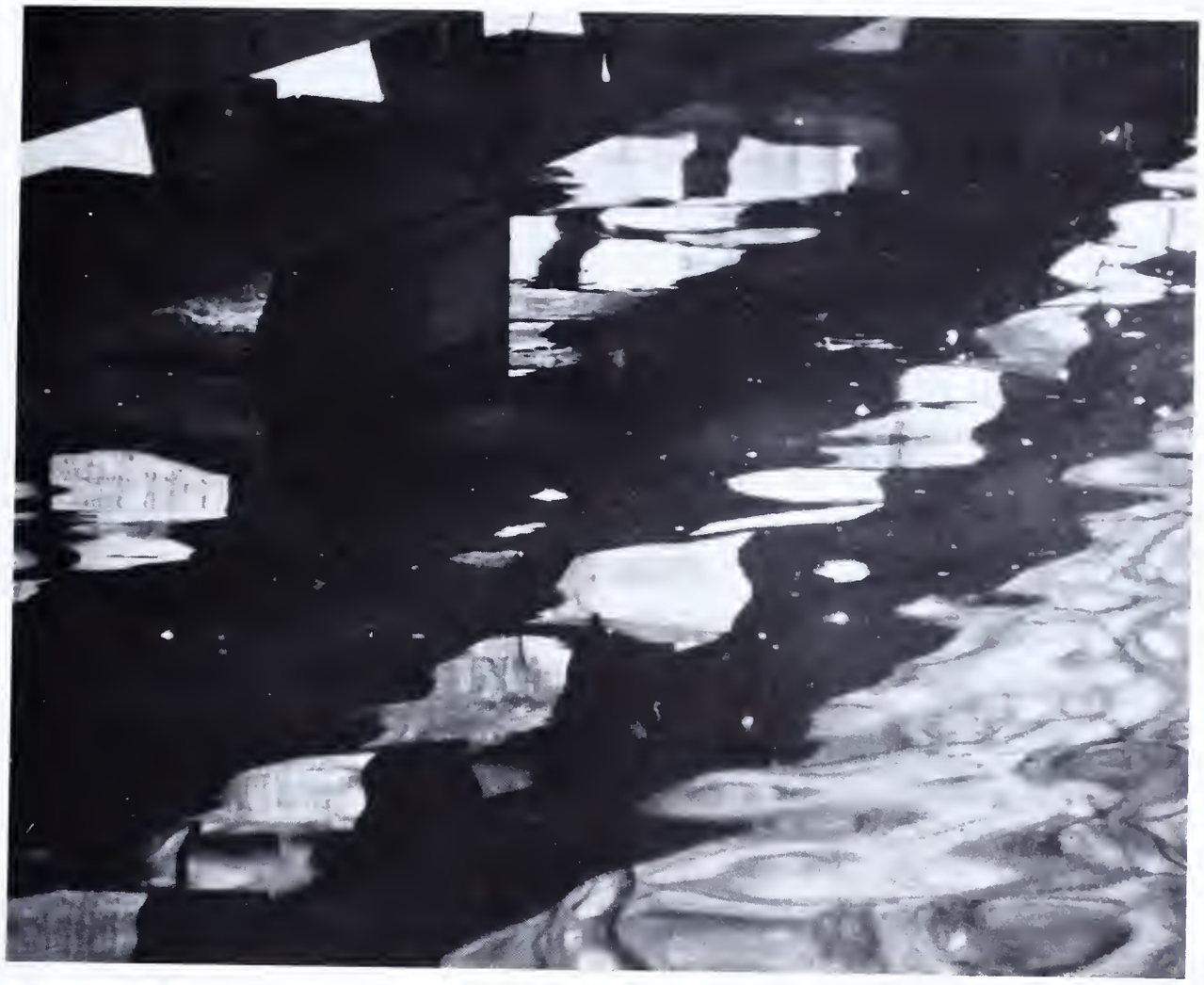
In order to implement the proposed plan of actions, certain resource commitments would be required. Those resource commitments which would likely be irreversible and irretrievable include:

(1) Labor and materials associated with the construction, operation, and maintenance activities required to implement various proposals of the plan.

(2) At impoundment sites, wildlife habitat and land productivity consisting of forest, crop, grazing, residential, and miscellaneous uses would be lost.

(3) Channelization of streams would result in a loss to existing fish and wildlife habitat.

(4) Ecological changes could be expected in streams affected by impoundments; evaluation of the degree of enhancement or degradation for various species of fish, wildlife, and vegatation cannot be reliably predicted without further study.



Canaan Valley Natural Area and Davis Pumped Storage Project

The Canaan Valley Natural Area and the Davis Pumped Storage Project pose alternative uses of the same resource. Canaan Valley possesses unusual ecological associations which are unique to the eastern United States, and the natural area proposal provides both a possible protective measure and a means for utilizing this resource. Davis Pumped Storage Project would add 1,000 MW of peaking capacity to the present supply of 7,325 MW for Power Supply Area (PSA)7. PSA7, which is four times larger than the Monongahela Basin, has a projected demand of 24,100 MW by 2000. Power and environmental considerations must be balanced prior to inclusion of these two projects in the recommended plan.

CANAAN VALLEY: A broad valley with a north-south axis located at the edge of the Allegheny plateau. Drainage area of the entire valley is 55 square miles (35,000 acres) with the valley floor consisting of 47 square miles (30,000 acres) at elevation 3,200 feet. More than 27,300 acres of valley land is held in private ownership and developmental activities are increasing. Canaan Valley State Park (6,014 acres) and Monongahela National Forest (1,361 acres) lie within the valley.

A Possible Protective Measure: Purchase of Canaan Valley by special Congressional authority as a wildlife management area to be managed by the State of West Virginia for its natural history values and its recreational use for hunting.

Beneficial Effects

- Preservation of a large complex of boreal vegetative communities at a southern latitude which support diverse wildlife populations.
- Preservation of 2,800 acres of woodcock habitat.
- Preservation of the southernmost breeding area of the snipe.
- Provision of 14,223 hunter days (woodcock, snipe, wild turkey, ruffed grouse, water fowl, black bear, raccoon, deer, furbearers, and woodchuck).
- Preservation of outdoor education resources (bogs, sedges, Canadian legumes, etc.)
- Preservation of one of two known areas in West Virginia naturally self-sustaining brown trout.

Adverse Effects

- Loss of 1,000 MW of peaking capacity.
- Loss of water quality benefits.
- Loss of inherent flood damage benefits.
- Loss of broad water recreational opportunities.

DAVIS PUMPED STORAGE PROJECT:

The project would consist of an upper reservoir located atop Cabin Mountain on the headwaters of Red Creek with a usable storage capacity of 26,600 acre-feet, and a lower reservoir on the Blackwater River in Canaan Valley with a storage capacity of 162,000 acre-feet and a surface area of 7,000 acres at maximum normal pool level. Minimum flow releases to the Blackwater will be 11 cfs. Recreational developments include a 250-acre fisherman access area, a 185-acre 100-unit camping area, a 188-acre picnicking, marina and harbor area, and a 400-acre site consisting of an information center, boat launching and associated facilities, and picnic sites. An interpretive center and overlook are also planned on Canaan Mountain.

Beneficial Effects:

- A 7,000-acre aquatic habitat with associated fishing, hunting, and trapping
- An estimated annual visitor use of up to 500,000 people.
- Establishment and maintenance in its natural state of a 6,240-acre conservation area in the valley.
- Preservation, protection, and orderly development of much of the valley.
- Improvement of downstream water quality and associated fishery.
- Reduction of flood flows at Davis, W. Va., from 290,000 cfs to 6,570 cfs.
- Provision of 1,000 MW of peaking capacity to the supply for PSA-7.

Adverse Effects:

- Inundation of Dobbin Slashings, the largest bog in the sods and rated as the largest bog at this elevation in the highlands.
- Inundation of approximately 7,620 acres of terrestrial wetland habitat.
- Estimated loss of hunting days/year with lake only (loss with lake and uncontrolled development shown in parenthesis):

  woodcock – 490 (894)
  snipe – 440 (550)
  wild turkey – 654 (3,456)
  ruffed grouse – 399 (1,200)
  water fowl – 125 (175)
  black bear – 30 (75)
  raccoon – 80 (75)
  white tailed deer – 1,250 (5,000)
  furbearers – 2,100 (2,480)
  woodchuck – 837 (2,942)

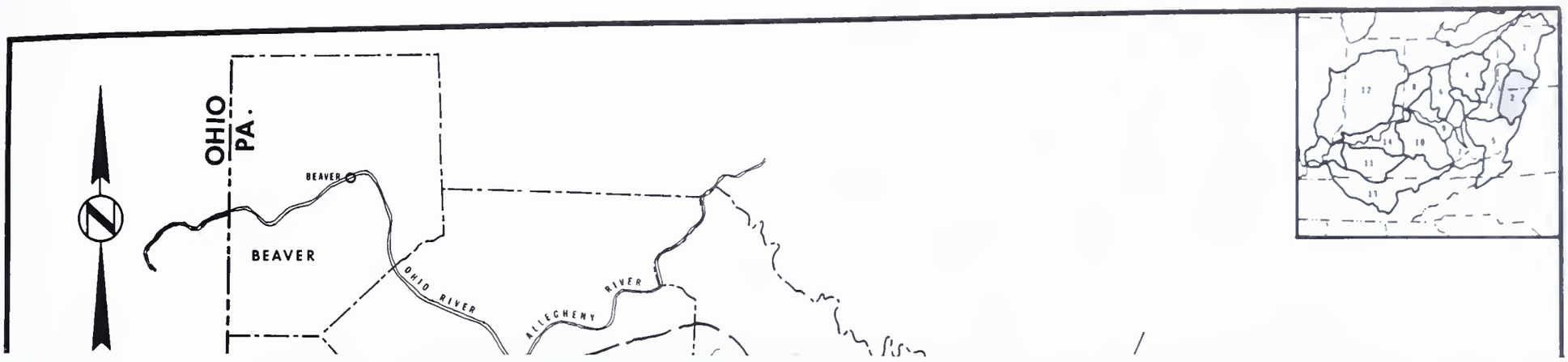
- Loss of unique habitat and opportunities of outdoor recreation.

Alternatives

- Major power alternatives to be considered in relation to the Davis Power Project include satisfying the proposed 1,000 MW portion of the projected peak demand for PSA-7 from other potential pumped storage sites (both in and outside of the Monongahela Basin) or from other types of power production.
- Other pumped storage sites within the Monongahela Basin have been considered in this report. Others are discussed in the Federal Power Commission E.I.S. Those considered in the FPC Report include: Glade Run Site, North River Mountain Site, Savage River Site, North Fork Shenandoah Site, Glady Fork-Otter Creek Site, Rowlesburg Site, Upper Blackwater Site, and the Davis Site.
- The most frequently considered alternative to the Davis Project is Glade Run. This is essentially the same site as the Davis Power Project from a power standpoint. The major differences are that Glade Run inundates 715 acres as compared to 7,000 for the Davis Power Project; costs an additional $37.6 million (1972 dollars); has a larger drawdown; and has no broad water recreation.
- Various modifications and constraints have been proposed for the originally formulated Davis Project:

  a. The proposal as above, with the exception of a modification of the lower reservoir to 700 acres and the exclusion of recreational development.

  b. Construction of Davis Pumped Storage Project as proposed, with three alternatives for the southern end of the valley: acquisition by the Allegheny Power System (APS) which would either manage the area or co-manage it with West Virginia; acquisition and management by West Virginia or the US Forest Service; or strict zoning.


OHIO
PA.
BEAVER
BEAVER
OHIO RIVER
ALLEGHENY
RIVER

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WESTMORELAND
MONONGAHELA RIVER
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SOMERSET
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FAYETTE
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GARRETT
OAKLAND
HARRISON
PRESTON
GRAFTON
CLARKSBURG
TAYLOR
M.D.
W. VA.
BARBOUR
PHILIPPI
EXISTING BLACKWATER FALLS STATE PARK
PARSONS
TUCKER
WESTON
LEWIS
BUCKHANNON
ELKINS
EXISTING CANAAN VALLEY STATE PARK
CANAAN [illegible] NATIONAL [illegible] AREA
DAVIS PUMPED STORAGE PROJECT
GLADE RUN ALTERNATIVE
RANDOLPH
UPSHUR
POCAHONTAS

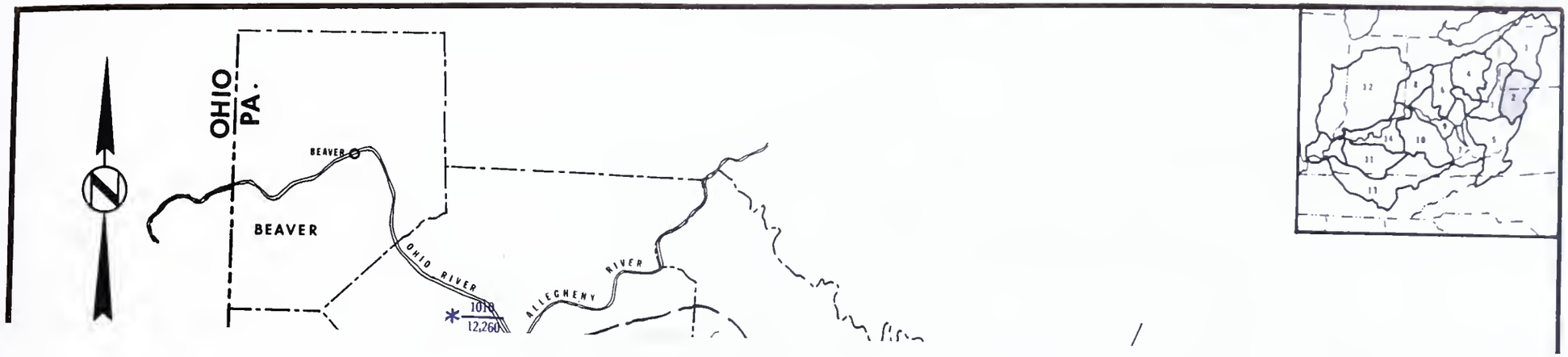
Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE
10 0 10 20 Kilometers
10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO
1974

Resource Maps



Selected Stream Flow Data

OHIO
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W. VA.
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W. VA.
MD.
PA.

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RANDOLPH
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TUCKER
PRESTON
GARRETT
FAYETTE
SOMERSET
WESTMORELAND
LEWIS

OHIO RIVER
ALLEGHENY RIVER
MONONGAHELA RIVER

PITTSBURGH
WASHINGTON
WAYNESBURG
MORGANTOWN
FAIRMONT
CLARKSBURG
GRAFTON
PHILIPPI
BUCKHANNON
WESTON
ELKINS
KINGWOOD
OAKLAND
PARSONS
UNIONTOWN
GREENSBURG
SOMERSET

1010 / 12,260
1000 / 12140 — 0854
310 / 3050
0.0 / 5.27 — 0840
310 / 2857 — 0835
0750 — 420 / 8871
245 / 2870
0.07 / 5.48 — 0830
415 / 8436
0745 — 13 / 978
240 / 2524 — 0825
0730 — 0.2 / 199
405 / 8230
240 / 2420
0815 / 1957
0800 — 4.6 / 262
14 / 645 — 0790
400 / 7988 — 0725
220 / 1935 — 0810
330 / 4530
50 / 860
1.1 / 130
1.0 / 116 — 0780
0720 — 0.6 / 272
328 / 4340
38 / 3140
47 / 632 — 0765
1.4 / 103 — 0625
1.9 / 420 Cr. — 0705
0675 — 167
132
37 / 2390
192 / 2602 — 0570
287 — 0755
0610 — 10 / 1158
29 / 192
190 / 2430 — 0560
34 / 2230 — 0700
0605 — 11.4
6.7 / 646
0.35 / 122 — 0595
0549 — 9 / 2297
0585 — 0.35 / 304
0695 — 28 / 1664
9.5 / 741 — 0650
0660
0580 — 0.34 / 290
20 / 591 — 0535
1.4 / 400
0520 — 37 / 1387
3.7 / 795 — 0510
8 / 551 — 0690
1.7 / 496 — 0505
0.78 / 343 — 0500

SELECTED STREAM FLOW DATA

0755 U5G5 GAGE NUMBER

8 / 1950 — 7 DAY-10 YEAR LOW FLOW (CFS) / AVERAGE FLOW FOR PERIOD OF RECORD (CFS)

* Extropoloted from existing stotions by U5G5

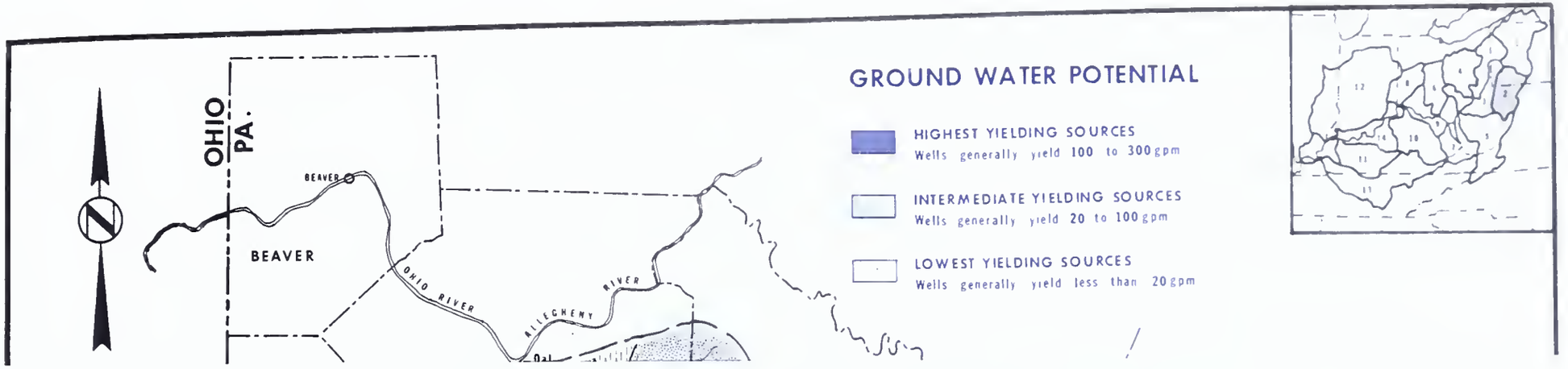
Source: Ohio River Bosin Comprehensive Survey (1969)
& U5GS Water Supply Paper #1907 (1971)
& U5G5 Files 1974

Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE
10 0 10 20 Kilometers
10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO
1974



Ground Water and Geologic Formations

GROUND WATER POTENTIAL

HIGHEST YIELDING SOURCES
Wells generally yield 100 to 300 gpm

INTERMEDIATE YIELDING SOURCES
Wells generally yield 20 to 100 gpm

LOWEST YIELDING SOURCES
Wells generally yield less than 20 gpm

OHIO
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BEAVER
BEAVER
OHIO RIVER
ALLEGHENY RIVER
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WASHINGTON
WESTMORELAND
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TAYLOR
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PHILIPPI
PARSONS
TUCKER
WESTON
ROCKHANNON
LEWIS
ELKINS
RANDOLPH
UPSHUR
POCAHONTAS

GENERALIZED GEOLOGIC FORMATIONS

	thickness, in feet		
Qal	0–90	Alluvial clay, silt, sand, and gravel underlying flood plains of the major rivers.	QUATERNARY
PPd	0–1200	Dunkard Group: shale, sandstone, limestone, and coal	PENNSYLVANIAN and PERMIAN
Pm	0–600	Monongahela Formation: shale, sandstone, limestone, and coal.	PENNSYLVANIAN
Pc	0–800	Conemaugh Formation: sandstone, shale, limestone, and coal.	PENNSYLVANIAN
Pa.p	0–1300	Allegheny and Pottsville Formations: sandstone, conglomerate, shale, and coal.	PENNSYLVANIAN
Mu	0–2000	Mississippian System, undivided: includes Mauch Chunk Shale: shale and sandstone. Greenbrier Limestone: limestone. Pocono Formation: sandstone and shale.	MISSISSIPPIAN
Du	max 7000+	Upper Devonian Series, undifferentiated shale, sandstone, and limestone.	DEVONIAN

PALEOZOIC

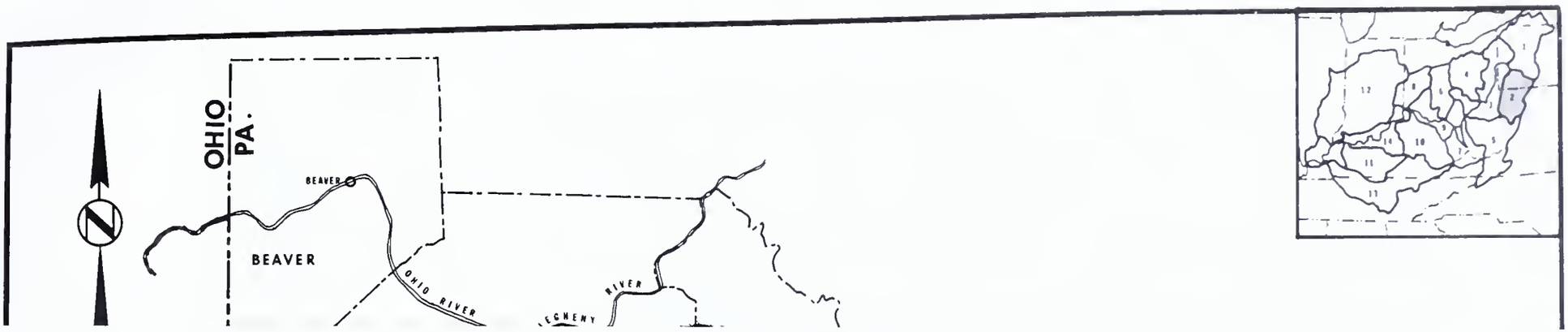
NOTE: Adapted from selected maps of the U.S. Geological Survey and State agencies

Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE
10 0 10 20 Kilometers
10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO
1974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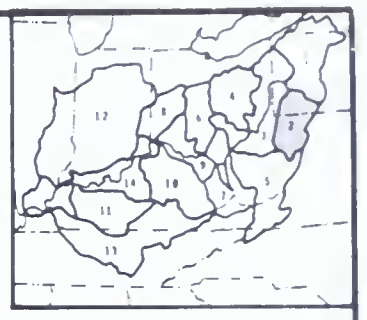
RIVER



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WESTMORELAND
MONONGAHELA RIVER
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BARBOUR
PHILIPPI
PARSONS
TUCKER
WESTON
BUCKHANNON
LEWIS
ELKINS
RANDOLPH
UPSHUR
POCAHONTAS

COAL BEARING FORMATIONS

Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE

10 0 10 20 Kilometers

10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION

CINCINNATI, OHIO 1974

OHIO
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RIVER

OHIO
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RIVER
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RANDOLPH
UPSHUR
POCAHONTAS

EXISTING LAND USE

- URBAN
- FOREST
- AGRICULTURAL
- DISTURBED

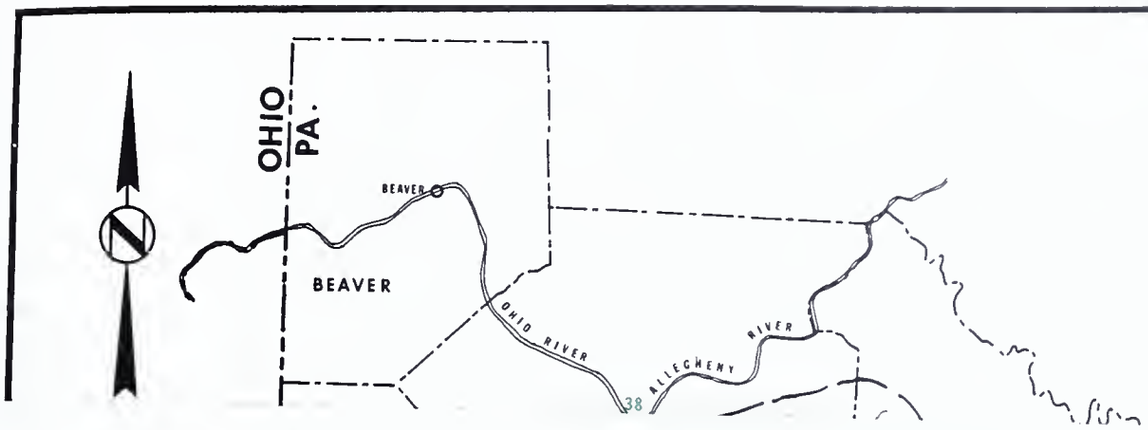
Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

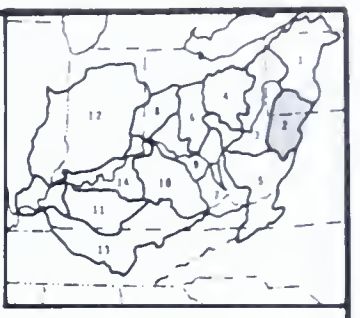
SCALE
10 0 10 20 Kilometers
10 0 10 20 Miles

Ref.: Maryland: Generalized Land Use Map, Md. Dep't. State Planning , 1972.
Pennsylvania: Generalized Land Use Map, Pa. Office of State Planning and Development, 1968.
West Virginia: Generalized Land Use Draft Maps, W. Va. Office Federal/State Relations, 1968-69.

OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO
1974



Baseline of Existing and Underway Projects and Programs (1st of 2 maps)



FLOOD DAMAGE ABATEMENT

- RESERVOIR
- WATERSHED PROJECT
- LOCAL PROTECTION PROJECT
- REGULATION-INSURANCE
- ENVIRONMENTAL CORRIDOR
- FLOOD FORECASTING

TRANSPORTATION

- T LOCK & DAM
- PORT FACILITY

POWER

- T THERMAL
- H HYDRO

NATURAL, HISTORICAL & RECREATIONAL

- NATIONAL FOREST
- STATE FOREST
- NATIONAL PARK
- STATE PARK
- PUBLIC HUNTING AREA
- WILDLIFE REFUGE
- NATURAL AREA
- ENVIRONMENTAL CORRIDOR
- WILD & SCENIC RIVER
- RECREATION AREA
- HISTORICAL SITE
- ARCHEOLOGICAL SITE

BASELINE OF EXISTING & UNDERWAY PROJECTS & PROGRAMS

REVISED: OCTOBER 25, 1974

Map ID numbers refer to text.

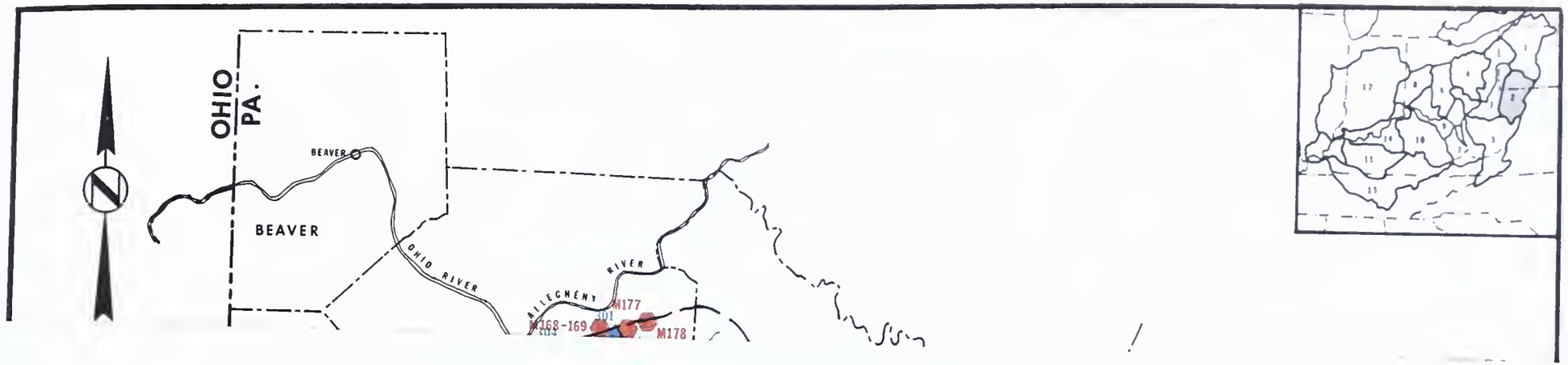
MONONGAHELA RIVER BASIN

SCALE

10 0 10 20 Kilometers

10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO 1974



Baseline of Existing and Underway Projects and Programs (2nd of 2 maps)

WATER QUALITY CONTROL

WASTEWATER TREATMENT

- MUNICIPAL
- INDUSTRIAL

LOW FLOW AUGMENTATION

MINE DRAINAGE ABATEMENT

DISPERSED SOURCES CONTROL

WATER SUPPLY

- MUNICIPAL-GROUND
- MUNICIPAL-SURFACE

OHIO
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BUCKHANNON
ELKINS

OHIO RIVER
ALLEGHENY RIVER
MONONGAHELA RIVER
Youghiogheny River
Cheat River
Tygart River
West Fork River
Buckhannon River
Middle Fork River
Deep Creek Lake

BASELINE OF EXISTING & UNDERWAY PROJECTS & PROGRAMS

REVISED: OCTOBER 25, 1974

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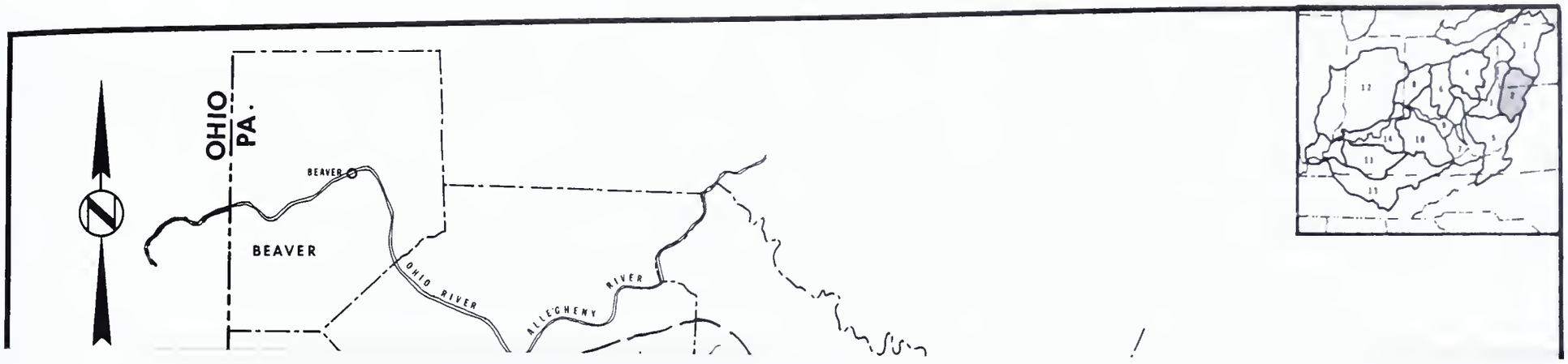
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OAKLAND
PARSONS
SOMERSET

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ALTERNATIVES NOT SELECTED

- NATURAL AREA
- ARCHEOLOGICAL AREA
- WILD & SCENIC R VER
- MAJOR RESERVOIR
- D MINOR RESERVOIR
- WATERSHED PROJECT
- LOCAL PROTECTION PROJECT
- HYDROELECTRIC PLANTS

Map ID numbers refer to text.

MONONGAHELA RIVER BASIN

SCALE
10 0 10 20 Kilometers
10 0 10 20 Miles

OHIO RIVER BASIN COMMISSION
CINCINNATI, OHIO 1974

GENERAL ALTERNATIVE CONSIDERED FLOOD DAMAGE ABATEMENT

Dams

Dikes and Walls

Channel Modification

Flood Proofing

Watershed Treatment
(Including vegetative measures)

Relocation

Flood Warning System

Flood Insurance

Zoning Ordinances

Subdivision Regulations

Building Codes

Environmental Corridors

Easements and Purchases

Tax Incentives

Restrictions on Public Works and Utility Systems

Flood Plain Identification

Storm Water Management

Other

No Action

GENERAL ALTERNATIVES CONSIDERED
WATER SUPPLY

Surface Reservoirs

Ground Water Reservoirs

Ground Water Recharge

Use Restrictions

Transfer to Non Drinking Quality Supplies

Alteration in Zoning and Development Patterns

Adjustment of Consumer Charges

Recycling

Changes in Water Use Process or Equipment

Reduction of System Leakage

Reduction of Reservoir Sedimentation

Removal of Price Supports

Interbasin Transfers

Desalinization Treatment

Other

No Action

GENERAL ALTERNATIVES CONSIDERED
WATER QUALITY

Effluent Treatment Measures

- Secondary Waste Treatment
- Advanced Waste Treatment
- Industrial Waste Treatment
  - a. Best practical
  - b. Best available

Source Modification Measures

- Mine Sealing
- Land Treatment and Reclamation (including bank stabilization)
- Recycling
- Neutralization
- Individual Package Treatment Facilities (Residential & Commercial)
- Industrial Process Changes

Operational and Regulatory Measures

- Changes in Use of Consumer Products (e.g. Pesticides and Detergents)
- Zoning and Development Restrictions
- Operational Modifications to existing facilities or collector systems
- Centralization/decentralization of institutions
- Stream Flow Regulation
- Effluent Flow Regulation
- Reservoir Management
- Effluent Taxes
- Improved Enforcement Procedures

Other

- No Action

GENERAL ALTERNATIVES CONSIDERED
NATURAL & HISTORIC

Environmental Corridors

Impoundments

Zoning regulations

Easements

Tax incentives

Subdivision regulations

Improved access

Improved facilities

Improved programs

Governmental designations

Improved enforcement of regulations

Land acquisition

Flow regulation

Other

No action

ALTERNATIVES CONSIDERED BUT NOT SELECTED

SUBREGION: Monongahela
DRAINAGE BASIN: Tygart

MAP ID	PROJECT OR PROGRAM	PRINCIPAL AGENCY	COUNTY/STATE	FUNCTIONAL NEEDS ADDRESSED	REMARKS
345	Fink Run Watershed	USDA	Upshur & Lewis, W. Va.	FDA, WQ	
347	Anglins Run Watershed	USDA	Barbour, W. Va.	FDA, WQ	
362	Berkeley Run Watershed	USDA	Taylor, W. Va.	FDA, WQ	
351	Sand Run Watershed		Upshur, W. Va.	FDA	
352	Turkey Run Watershed		Upshur, W. Va.	FDA, WQ, NHR	
354	Big Run Watershed	USDA	Barbour & Upshur, W.Va.	FDA, WQ, NHR	
355	Upper Buckhannon River, French Cr. and Fink's Run Watershed	USDA	Upshur, Randolph, and Webster, W. Va.	FDA, WS NHR	
357	Belington Channel Modification	USDA	Barbour, W. Va.	FDA	
358	Middle Fork River Watershed	USDA	Randolph, W. Va.	FDA	
359	Wickwire Run & Lost Run Watershed	USDA	Taylor, W. Va.	FDA	
360	Upper Tygarts Valley River Watershed	USDA	Randolph, W. Va.	FDA	
365	Tygart Power Plant		Taylor, W. Va.	P	
366	Laurel Power Plant		Barbour, W. Va.	P	
367	Tygart River Reservoir		Taylor, W. Va.		
368	Tygart River Reservoir				
369	Tygart River Reservoir		Barbour, W. Va.		

ALTERNATIVES CONSIDERED BUT NOT SELECTED

SUBREGION: Monongahela
DRAINAGE BASIN: Tygart
Date:

MAP ID	PROJECT OR PROGRAM	PRINCIPAL AGENCY	COUNTY/STATE	FUNCTIONAL NEEDS ADDRESSED	REMARKS
370	Tygart River Reservoir		Barbour, W. Va.		
371	Tygart River Reservoir		Barbour, W. Va.		
372	Tygart River Reservoir		Randolph, W. Va.		
373	Tygart River Reservoir		Randolph, W. Va.		
374	Middle Fork River Reservoir		Barbour, W. Va.		
375	Middle Fork River Reservoir		Randolph, W. Va.		
376	Buckhannon River Reservoir		Barbour, W. Va.		
377	Tygart River Reservoir		Barbour, W. Va.		
378	Laurel Creek Reservoir		Barbour, W. Va.		
379	Sandy Creek Reservoir		Preston, W. Va.		

ALTERNATIVES CONSIDERED BUT NOT SELECTED

SUBREGION: Monongahela
DRAINAGE BASIN: West Fork

MAP ID	PROJECT OR PROGRAM	PRINCIPAL AGENCY	COUNTY/STATE	FUNCTIONAL NEEDS ADDRESSED	REMARKS
380	Worthington Channel Modification	Army	Marion, W. Va.	FDA	
381	West Fork River & Tributaries Channel Modification	Army	Monongahela, W. Va.	FDA	
384	Booths Creek & Hustead Run Channel Modification	Army		FDA	
385	West Fork River & Elk Creek Channel Modification	Army	Harrison, W. Va.	FDA	
386	Enterprise, W. Va.	Army	Harrison, W. Va.	FDA	
387	West Fork River Channel Modification	Army	Harrison, W. Va.	FDA	
388	West Fork River Reservoir		Harrison, W. Va.		
390	(Wallace) Little Tenmile Creek Channel Modification	Army	Harrison, W. Va.	FDA	
400	(Wilsonburg & Vicinity) Limestone Run Channel Modification	Army	Harrison, W. Va.	FDA	
392	Salem Fork of Tenmile Creek Channel Modification	Army	Harrison, W. Va.	FDA	
395	Freemans Creek Watershed	USDA	Lewis, W. Va.	FDA, WQ, NHR	
396	Booth's Creek Watershed	USDA	Marion, Taylor and Harrison, W. Va.	FDA, WQ	
397	Upper West Fork Watershed	USDA	Lewis & Upshur, W. Va.	FDA, WQ	
393	Lost Creek Geelick Channel Mod.	Army	Harrison, W. Va.	FDA	

ALTERNATIVES CONSIDERED BUT NOT SELECTED

SUBREGION: Monongahela
DRAINAGE BASIN: West Fork

MAP ID	PROJECT OR PROGRAM	PRINCIPAL AGENCY	COUNTY/STATE	FUNCTIONAL NEEDS ADDRESSED	REMARKS
399	Kincheloe Creek Watershed	USDA	Harrison & Lewis, W. Va.	FDA, WQ, WS, NHR	
391	Limestone Run Watershed	USDA	Harrison, W. Va.	FDA, WQ	
690	Stonecoal Creek Watershed	USDA	Lewis & Upshur, W. Va.	FDA	
691	Elk Creek Reservoir	Army	Harrison, W. Va.	FDA	

ALTERNATIVES CONSIDERED BUT NOT SELECTED

SUBREGION: Monongahela
DRAINAGE BASIN: Cheat

MAP ID	PROJECT OR PROGRAM	PRINCIPAL AGENCY	COUNTY/STATE	FUNCTIONAL NEEDS ADDRESSED	REMARKS
728	Big Sandy Creek Watershed	Army	Fayette, Pa. Preston, W. Va.	FDA, WQ, NHR	
729	Big Sandy Creek Watershed	USDA	Fayette, Pa. Preston, W. Va.	FDA, WQ, NHR	
730	(Parsons) Cheat River Channel Modification	Army	Tucker, W. Va.	FDA	
731	Mill Run Watershed	USDA	Preston, W. Va.	FDA, WQ, NHR	
732	Shavers Fork Watershed	USDA	Tucker, W. Va.	FDA	
733	Buffalo Run Watershed	USDA	Preston, W. Va.	FDA	
734	Muddy Creek Watershed	USDA	Preston, W. Va.	FDA	
736	Davis Power Project	Allegheny Power System	Tucker, W. Va.	P, NHR	
737	Canaan Valley Natural Area	D.O.I., W. Va. USDA	Tucker, W. Va.	NHR	
740	Laurel-Glady Fork Power Plant		Randolph, W. Va.	P	
741	Shavers Fork Reservoir		Randolph, W. Va.		
742	Cheat River Reservoir		Preston, W. Va.		
743	Cheat River Reservoir		Preston, W. Va.		
744	Cheat River Reservoir		Preston, W. Va.		
745	Cheat River Reservoir		Preston, W. Va.		

ALTERNATIVES CONSIDERED BUT NOT SELECTED

SUBREGION: Monongahela
DRAINAGE BASIN: Cheat

MAP ID	PROJECT OR PROGRAM	PRINCIPAL AGENCY	COUNTY/STATE	FUNCTIONAL NEEDS ADDRESSED	REMARKS
746	Big Sandy Creek Reservoir		Preston, W. Va.		
747	Big Sandy Creek Reservoir		Preston, W. Va.		
748	Glady Fork Reservoir		Randolph, W. Va.		
749	Dry Fork Reservoir		Tucker, W. Va.		
750	Laurel Fork Reservoir		Randolph, W. Va.		
751	Black Water River Reservoir		Tucker, W. Va.		
752	Black Water River Reservoir		Tucker, W. Va.		
753	Black Water River Reservoir		Tucker, W. Va.		
754	Laurel Fork Reservoir		Randolph, W. Va.		
759	Beaver Hole Power Plant		Monongalia, W. Va.	P	

ALTERNATIVES CONSIDERED BUT NOT SELECTED

SUBREGION: Monongahela
DRAINAGE BASIN: Youghiogheny

MAP ID	PROJECT OR PROGRAM	PRINCIPAL AGENCY	COUNTY/STATE	FUNCTIONAL NEEDS ADDRESSED	REMARKS
692	Indian Creek Watershed Project	USDA	Fayette & Westmoreland, Pa.	FDA, WS, NHR	
693	Crellin Reservoir	Army	Garrett, Md.	FDA	
694	Upper Casselman Reservoir		Garrett, Md.	FDA	
695	Laurel Hill Creek Lake	Army	Somerset, Pa.	FDA, WQ, WS	
707	Lower Casselman River Area		Somerset, Pa.	NHR (Archeological)	
708	Lower Youghiogheny River Area (7 Sites)		Somerset, Pa.	NHR (Archeological)	
709	Upper Youghiogheny River Area (6 Sites)		Garrett, Md.	NHR (Archeological)	
710	Deep Creek Lake Area (44 Sites)		Garrett, Md.	NHR (Archeological)	
711	Casselman State Scenic River		Somerset, Pa.	NHR (Scenic Corridor)	
712	Puzzley Creek State Scenic River		Garrett, Md.	NHR (Scenic Corridor)	
713	Dam C Power Plant		Fayette, Pa.	P	
714	Dam B Power Plant		Fayette, Pa.	P	
715	Dam A Power Plant		Fayette, Pa.	P	
716	Youghiogheny Power Plant		Fayette, Pa.	P	

ALTERNATIVES CONSIDERED BUT NOT SELECTED

SUBREGION: Monongahela
DRAINAGE BASIN: Youghiogheny

MAP ID	PROJECT OR PROGRAM	PRINCIPAL AGENCY	COUNTY/STATE	FUNCTIONAL NEEDS ADDRESSED	REMARKS
717	Sang Run Power Plant		Garrett, Md.	P	
718	Youghiogheny River Reservoir		Fayette, Pa.		
719	Youghiogheny River Reservoir		Garrett, Md.		
720	Youghiogheny River Reservoir		Garrett, Md.		
721	Youghiogheny River Reservoir		Garrett, Md.		
722	Muddy Creek Reservoir		Garrett, Md.		
723	Casselman River Reservoir				
724	Casselman River Reservoir		Somerset, Pa.		
725	Casselman River Reservoir		Garrett, Md.		
726	Casselman River Reservoir		Somerset, Pa.		
727	Casselman River Reservoir		Garrett, Md.		

ALTERNATIVES CONSIDERED BUT NOT SELECTED

SUBREGION: Monongahela
DRAINAGE BASIN: Lower Monongahela

MAP ID	PROJECT OR PROGRAM	PRINCIPAL AGENCY	COUNTY/STATE	FUNCTIONAL NEEDS ADDRESSED	REMARKS
761	Homestead (Whitaker) Run Channel Modification	Army	Allegheny, Pa.	FDA	
762	Dunlap Creek Watershed	USDA	Fayette, Pa.	FDA, NHR, WO	
763	Redstone Creek Study	USDA	Fayette, Pa.	FDA	
765	Tenmile Creek Reservoir	Army			
778	Rices Landing Local Flood Protection Project	Army			
779	West Brownsville Local Flood Protection Project	Army			
780	Dravosburg Local Flood Protection Project	Army			
781	McKeesport Local Flood Protection Project	Army			
782	Monongahela City Local Flood Protection Project	Army			
82	Grays Landing Lock & Dam Power Plant		Fayette, Pa.		
81	Maxwell Lock & Dam Power Plant		Fayette, Pa.		

ALTERNATIVES CONSIDERED BUT NOT SELECTED

SUBREGION: Monongahela
DRAINAGE BASIN: Upper Monongahela

MAP ID	PROJECT OR PROGRAM	PRINCIPAL AGENCY	COUNTY/STATE	FUNCTIONAL NEEDS ADDRESSED	REMARKS
784	Pharoah Run Watershed	USDA	Marion, W. Va.	FDA	
786	Lower Deckers Creek Watershed	USDA	Monongalia and Preston, W. Va.	FDA, WQ, NHR	
787	Lower Deckers Creek Channel Modification	Army	Monongalia and Preston, W. Va.	FDA	
90	Opekiska Lock & Dam Power Plant		Monongalia, W. Va.	P	

ABANDONED MINE DRAINAGE ABATEMENT

STATE: Md., Pa., W. Va. SUBREGION: Monongahela

FOR DETAILED PLANNING:

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	EPA SITE	COUNTY	NET ACIDITY (PPD)	CUMULATIVE % ACID LOAD	ESTIMATED TOTAL COSTS ($000)
I	533	Simpson Creek	14105	Harrison, W. Va.	35,620	4.58	236
I	534	Simpson Creek	14189	Harrison, W. Va.	22,480	7.46	204
II	535	York Run-Georges Creek	20401 (SL-186)	Fayette, Pa.	22,400	10.34	1,265
II	536	Lambert Run	64095	Harrison, W. Va.	18,870	12.76	602
I	537	Brush Creek-Turtle Creek	18095 (SL-103-5)	Westmoreland/Pa.	16,720	14.91	142
I	538	Sewickley Creek	22001 (SL-103-5)	Westmoreland, Pa.	15,940	16.96	74
I	539	Simpson Creek	14158	Harrison, W. Va.	11,440	18.43	110
I	540	Turtle Creek	32028 (SL-103-5)	Westmoreland, Pa.	10,920	19.83	35
II	541	Cheat	33026	Monongalia, W. Va.	9,950	21.11	570
II	542	Cheat	33015	Monongalia, W. Va.	9,700	22.36	654

NOTE:

(a) The recommendations for orphan mine drainage abatement measures were taken from the April 1974 draft of the ARC Environmental Improvement Program for the Monongahela River Basin. This draft was prepared by Gibbs & Hall, Inc. for the Appalachian Regional Commission. The cut off for inclusion in the Plan was 76% of total poundage in basin.

(b) The numbers in parentheses below an EPA site number (eg. SL-103-5) are Pennsylvania Abatement Studies for the same mines. State projects which do not correspond to the mines chosen from the ARC report are listed separately for implementation beginning on page

(c) PPD = Pounds per day

(d) Cumulative % Acid Load - example: Mines 533 and 534 have a total load of 7.46.

(e) Order of listing does not represent a priority.

ABANDONED MINE DRAINAGE ABATEMENT

STATE: Md, Pa, W.Va. SUBREGION: Monongahela

FOR DETAILED PLANNING:

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	E.P.A. SITE NO.	COUNTY	NET ACIDITY (PPD)	CUMULATIVE % ACID LOAD	ESTIMATED TOTAL COSTS ($ 000)
I	543	Redstone Creek	34219 (SL-141-2)	Fayette, Pa.	9,220	23.54	207
II	544	Monongahela	38277	Monongalia, W. Va.	8,560	24.64	459
I	545	Squires Cr.—Threefork Cr.	42074	Preston, W. Va.	8,550	25.74	70
II	546	Tygart	20003	Randolph, W. Va.	7,900	26.75	522
I	547	Muddy Creek	59015	Preston, W. Va.	7,730	27.75	105
I	548	Cheat	38212	Monongalia, W. Va.	7,630	28.73	109
I	549	Brushy Fork-Elk Creek	07170	Barbour, W. Va.	7,470	29.69	70
II	550	Raccoon Cr.—Threefork Cr.	42175	Preston, W. Va.	7,390	30.63	1,890
II	551	Indian Creek	10059	Fayette, Pa.	7,220	31.56	342
II	552	Simpson Creek	14168	Harrison, W. Va.	6,730	32.43	274
I	553	West Fork	62053	Harrison, W. Va.	6,730	32.43	95
I	554	Elk Creek	07178	Barbour, W. Va.	6,050	34.04	170
I	555	Deckers Creek	39001	Monongalia, W. Va.	5,870	34.79	54
I	556	Buffalo Run-Sewickley Creek	09118 (SL-103-4)	Westmoreland, Pa.	5,850	35.54	75
I	557	Lick Run	32047	Preston, W. Va.	5,760	36.28	210
II	558	West Fork	54029	Harrison, W. Va.	5,120	36.94	268
I	559	Jacks Run-Sewickley Cr.	16003 (SL-103-2)	Westmoreland, Pa.	4,910	37.57	83

ABANDONED MINE DRAINAGE ABATEMENT

STATE: Md, Pa, W.Va. SUBREGION: Monongahela

FOR DETAILED PLANNING:

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	E.P.A. SITE NO.	COUNTY	NET ACIDITY (PPD)	CUMULATIVE % ACID LOAD	ESTIMATED TOTAL COSTS ($ 000)
II	560	Coal Run-Casselman River	24036 (SL-118)	Somerset, Pa.	4,760	38.13	350
I	561	Simpson Creek	14161	Harrison, W. Va.	4,710	38.79	35
II	562	Brushy Fork-Elk Creek	07104	Barbour, W. Va.	4,620	39.38	1,390
I	563	Monongahela	48038	Monongalia, W. Va.	4,490	39.96	195
I	564	Simpson Creek	14107	Harrison, W. Va.	4,310	40.51	145
I	565	Simpson Creek	14172	Harrison, W. Va.	4,220	41.05	155
I	566	Raccoon Cr. – Threefork Cr.	42174	Preston, W. Va.	4,110	41.58	70
II	567	Shinns Run	14182	Harrison, W. Va.	4,070	42.10	280
I	568	Squires Cr. – Threefork Cr.	42099	Preston, W. Va.	3,940	42.61	70
I	569	Turtle Creek	26008	Westmoreland, Pa.	3,890	43.11	76
I	570	Casselman River	24189 (SL-118)	Somerset, Pa.	3,720	43.59	180
I	571	Youghiogheny	19725	Fayette, Pa.	3,700	44.06	75
I	572	Muddy Creek	59080	Preston, W. Va.	3,690	44.54	180
II	573	Bull Run	36103	Preston, W. Va.	3,660	45.01	575
I	574	Sewickley Creek	09088	Westmoreland, Pa.	3,590	45.47	22
I	575	Elk Creek	07133	Barbour, W. Va.	3,560	45.93	35
II	576	Raccoon Cr.–Threefork Cr.	42006	Preston, W. Va.	3,490	46.37	

ABANDONED MINE DRAINAGE ABATEMENT FOR DETAILED PLANNING:

STATE: Md, Pa, W.Va. SUBREGION: Monongahela

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	E.P.A. SITE NO.	COUNTY	NET ACIDITY (PPD)	CUMULATIVE % ACID LOAD	ESTIMATED TOTAL COSTS ($ 000)
I	577	Squires Cr.—Threefork Creek	42082	Preston, W. Va.	3,420	46.81	190
I	578	Unnamed Trib—Georges Creek	20419 (SL-186)	Fayette, Pa.	3,280	47.23	135
I	579	Browns Run	20331	Fayette, Pa.	3,250	47.65	21
II	580	Simpson Creek	14167	Harrison, W. Va.	3,210	48.06	420
I	581	Simpson Creek	14164	Harrison, W. Va.	3,140	48.47	100
II	582	Tygart	20010	Randolph, W. Va.	3,130	48.87	35
II	583	Hackers Creek	04082	Lewis, W. Va.	3,040	49.26	280
I	584	Casselman River	02015	Somerset, Pa.	3,030	49.65	100
I	585	Morgan Run	32125	Preston, W. Va.	3,000	50.03	35
I	586	Jacobs Creek	20160	Fayette, Pa.	2,980	50.42	155
I	587	Cheat	33013	Monongalia, W. Va.	2,950	50.79	145
I	588	Bull Run	36133	Preston, W. Va.	2,950	51.17	35
II	589	West Fork	54020	Harrison, W. Va.	2,940	51.55	249
II	590	North Fork-Blackwater River – Black Fork	45046	Tucker, W. Va.	2,910	51.92	71
I	591	Monongahela	48103	Monongalia, W. Va.	2,890	52.30	180
I	592	Coal Run—Casselman River	24148 (SL-118)	Somerset, Pa.	2,880	52.67	180
II	593	Squires Cr.—Threefork Creek	42142	Preston, W. Va.	2,850	53.03	235

ABANDONED MINE DRAINAGE ABATEMENT

STATE: Md.,Pa.,W.Va. SUBREGION: Monongahela

FOR DETAILED PLANNING:

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	E.P.A. SITE NO.	COUNTY	NET ACIDITY (PPD)	CUMULATIVE % ACID LOAD	ESTIMATED TOTAL COSTS ($ 000)
II	594	Cheat	38257	Monongalia, W. Va.	2,840	53.40	385
II	595	Casselman River	24138 (SL-118)	Somerset, Pa.	2,830	53.76	450
I	596	Georges Creek	20141 (SL-186)	Fayette, Pa.	2,800	54.12	131
II	597	Turtle Creek	32009 (SL-103-5)	Westmoreland, Pa.	2,780	54.48	295
I	598	York Run-Georges Creek	20417 (SL-186)	Fayette, Pa.	2,770	54.83	71
I	599	Simpson Creek	14140	Harrison, W. Va.	2,730	55.18	52
I	600	Jones Creek-Tenmile Creek	61021	Harrison, W. Va.	2,700	55.53	140
I	601	Indian Creek	10085 (SL-103-2)	Fayette, Pa.	2,690	55.88	180
I	602	Buffalo Creek—Casselman R.	24072	Somerset, Pa.	2,650	56.22	40
II	603	Indian Creek (W. Va.)	48084	Monongalia, W. Va.	2,590	56.55	515
I	604	York Run—Georges Creek	20403 (SL-186)	Fayette, Pa.	2,580	56.88	140
I	605	Squires Cr.—Threefork Creek	42144	Preston, W. Va.	2,580	57.21	83
I	606	Buffalo Creek—Casselman R.	24071	Somerset, Pa.	2,530	57.54	33
II	607	Cheat	38026	Monongalia, W. Va.	2,520	57.86	712
I	608	Monongahela	38117	Monongalia, W. Va.	2,510	58.18	110
I	609	Lambert Run	14089	Harrison, W. Va.	2,500	58.50	100

ABANDONED MINE DRAINAGE ABATEMENT

STATE: Md.,Pa.,W.Va. SUBREGION: Monongahela

FOR DETAILED PLANNING:

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	E.P.A. SITE NO.	COUNTY	NET ACIDITY (PPD)	CUMULATIVE % ACID LOAD	ESTIMATED TOTAL COSTS ($ 000)
II	610	Sandy Creek	13010	Fayette, Pa.	2,470	58.82	305
I	611	Martin Run-Muddy Creek	59071	Preston, W. Va.	2,320	59.12	84
I	612	Coons Run	22039	Allegheny, Pa.	2,290	59.41	96.1
I	613	Muddy Creek	59032	Preston, W. Va.	2,290	59.71	202
I	614	Redstone Creek	34221 (SL-141-2)	Fayette, Pa.	2,280	60.00	45
I	615	West Fork	54022	Harrison, W. Va.	2,270	60.29	141
I	616	Monongahela	25021	Washington, Pa.	2,250	60.58	60
II	617	Cheat	33027	Monongalia, W. Va.	2,230	60.87	354
I	618	Tygart	20040	Randolph, W. Va.	2,170	61.15	120
I	619	Shinns Run	54173	Harrison, W. Va.	2,160	61.42	180
II	620	Bull Run	36107	Preston, W. Va.	2,120	61.70	825
II	621	Jacobs Creek	20386	Fayette, Pa.	2,100	61.97	265
I	622	Shinns Run	14128	Harrison, W. Va.	2,050	62.23	70
I	623	Elk Creek	07108	Harrison, W. Va.	2,010	62.49	179
I	624	Beaver Cr.—Blackwater River-Black Fork	18043	Tucker, W. Va.	2,000	62.74	94
I	625	Casselman River	24137 (SL-118)	Somerset, Pa.	1,990	63.00	211
I	626	Lambert Run	14097	Harrison, W. Va.	1,980	63.25	55

ABANDONED MINE DRAINAGE ABATEMENT FOR DETAILED PLANNING:

STATE: Md., Pa., W.Va. **SUBREGION: Monongahela**

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	E.P.A. SITE NO.	COUNTY	NET ACIDITY (PPD)	CUMULATIVE % ACID LOAD	ESTIMATED TOTAL COSTS ($ 000)
I	627	Monongahela	25010	Washington, Pa.	1,970	63.51	60
II	628	Cheat	33023	Monongalia, W. Va.	1,950	63.76	335
I	629	York Run-Georges Creek	20396 (SL-186)	Fayette, W. Va.	1,920	64.00	206
I	630	Martin Run-Muddy Creek	59029	Preston, W. Va.	1,920	64.25	109
II	631	Monongahela	48058	Monongalia, W. Va.	1,880	64.49	339
I	632	Morgan Run	32062	Preston, W. Va.	1,880	64.73	36
I	633	Tygart	20027	Randolph, W. Va.	1,830	64.97	35
II	634	Muddy Creek	59021	Preston, W. Va.	1,810	65.20	392
I	635	Simpson Creek	14188	Harrison, W. Va.	1,800	65.43	177
I	636	Shinns Run	14166	Harrison, W. Va.	1,780	65.66	105
I	637	Martin Run-Muddy Creek	59027	Preston, W. Va.	1,770	65.89	95
I	638	Big Sandy Creek	08012	Preston, W. Va.	1,730	66.11	141
I	639	Coons Run	22032	Marion, W. Va.	1,720	66.33	70
I	640	West Fork	54199	Harrison, W. Va.	1,710	66.55	175
I	641	Monongahela	20144	Greene, Pa.	1,680	66.77	85
I	642	Sewickley	09003 (SL-103-4)	Westmoreland, Pa.	1,680	66.98	45
I	643	Greens Run	32077	Preston, W. Va.	1,660	67.20	70

ABANDONED MINE DRAINAGE ABATEMENT FOR DETAILED PLANNING:

STATE: Md., Pa., W. Va. SUBREGION: Monongahela

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	E.P.A. SITE NO.	COUNTY	NET ACIDITY (PPD)	CUMULATIVE % ACID LOAD	ESTIMATED TOTAL COSTS ($ 000)
II	644	Cheat	38206	Monongalia, W. Va.	1,650	67.41	1,200
II	645	Galley Run	09288 (SL-141-2)	Fayette, Pa.	1,650	67.62	451
I	646	Sewickley Creek	09009	Westmoreland, Pa.	1,640	67.83	79
I	647	Squires Cr.-Tnreefork Cr.	42096	Preston, W. Va.	1,630	68.04	70
I	648	Georges Creek	20140 (SL-186)	Fayette, Pa.	1,620	68.25	105
I	649	Monongahela	48030	Monongalia, W. Va.	1,590	68.45	205
I	650	Monongahela	48091	Marion, W. Va.	1,580	68.66	370
I	651	Lick Run	42124	Preston, W. Va.	1,570	68.86	180
I	652	Coal Run Casselman River	24167 (SL-118)	Somerset, Pa.	1,560	69.06	180
I	653	Simpson Creek	14165	Harrison, W. Va.	1,550	69.26	140
II	654	Raccoon Creek-Threeforks Creek	42187	Preston, W. Va.	1,550	69.46	425
II	655	Raccoon Creek-Threeforks Creek	42165	Preston, W. Va.	1,540	69.65	259
I	656	Coal Run-Casselman River	24171 (SL-118)	Somerset, Pa.	1,530	69.85	180
I	657	Mudlick Run	54180	Harrison, W. Va.	1,520	70.05	201
II	658	Turtle Creek	32019	Westmoreland, Pa.	1,510	70.24	327
II	659	Squires Cr.-Threefork Cr.	42120	Preston, W. Va.	1,480	70.43	330

ABANDONED MINE DRAINAGE ABATEMENT

STATE: Md., Pa. W.Va. SUBREGION: Monongahela

FOR DETAILED PLANNING:

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	E.P.A. SITE NO.	COUNTY	NET ACIDITY (PPD)	CUMULATIVE % ACID LOAD	ESTIMATED TOTAL COSTS ($ 000)
I	660	Turtle Creek	03007	Westmoreland, Pa.	1,480	70.62	145
I	661	Tygart	20015	Randolph, W. Va.	1,450	70.81	35
I	662	Greens Run	32083	Preston, W. Va.	1,440	70.99	70
II	663	Simpson Creek	46102	Taylor, W. Va.	1,420	71.17	750
I	664	Pringle Run	42153	Preston, W. Va.	1,420	71.36	180
I	665	Cheat	38260	Monongalia, W. Va.	1,410	71.54	200
I	666	West Fork	54070	Harrison, W. Va.	1,400	71.72	179
I	667	Monongahela	20165	Fayette, Pa.	1,390	71.90	69
I	668	Monongahela	38037	Monongalia, W. Va.	1,380	72.07	231
I	670	Deckers Creek	36042	Preston, W. Va.	1,360	72.25	61
I	671	West Fork	14209	Harrison, W. Va.	1,340	72.42	209
I	672	Berry Run-Simpson Creek	07077	Harrison, W. Va.	1,330	72.59	74
I	673	West Fork	14198	Harrison, W. Va.	1,310	72.76	180
I	674	Tygart	20018	Barbour, W. Va.	1,290	72.92	105
I	675	Squires Cr.-Threefork Cr.	42102	Preston, W. Va.	1,280	73.09	130
I	676	Elk Creek	46005	Barbour, W. Va.	1,280	73.25	45
I	677	Tygart	20025	Randolph, W. Va.	1,270	73.42	110
I	678	Turtle Creek	32010 (SL-103-5)	Westmoreland, Pa.	1,270	73.58	52

ABANDONED MINE DRAINAGE ABATEMENT

STATE: Md., Pa., W.Va. SUBREGION: Monongahela

FOR DETAILED PLANNING:

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	E.P.A. SITE NO.	COUNTY	NET ACIDITY (PPD)	CUMULATIVE % ACID LOAD	ESTIMATED TOTAL COSTS ($ 000)
I	679	Brinker Run-Sewickley Cr.	09004	Westmoreland, Pa.	1,270	73.74	50
II	680	Beaver Cr.-Blackwater River-Black Fork	18050	Tucker, W. Va.	1,260	73.90	490
I	681	Buffalo Cr.-Casselman River	02052 (SL-103-2)	Somerset, Pa.	1,250	74.07	70
I	682	Monongahela	48029	Monongalia, W. Va.	1,230	74.22	152
I	683	Poplar Run-Indian Creek	10096	Fayette, Pa.	1,230	74.38	125
I	684	Squires Cr.-Threefork Cr.	42078	Preston, W. Va.	1,220	74.54	175
I	685	Raccoon Cr.-Threefork Cr.	42147	Preston, W. Va.	1,210	74.69	70
I	686	West Fork	54017	Harrison, W. Va.	1,190	74.85	105
II	687	Simpson Creek	49016	Monongalia, W. Va.	1,180	75.00	70

ABANDONED MINE DRAINAGE ABATEMENT

STATE: Md., Pa., W.Va. **SUBREGION: Monongahela**

PROJECTS (BY STATE):

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	E.P.A. SITE NO.	COUNTY	NET ACIDITY (PPD)	TYPE OF EFFORT	ESTIMATED TOTAL COSTS ($ 000)
I	910	PA # SL 141-2 Redstone Creek and Uniontown Syncline Mining Area Study		Fayette, Pa.		PI	Not Available
I	896	PA # SL 186 Georges Creek Water-shed Mining Area Study		Fayette, Pa.	34,600	PI	8,700
I	905	PA # SL 103-4 Latrobe Syncline Mining Area Study		Westmoreland, Pa.	11,150	PI	10,000
I	537	PA # SL 103-5 Irwin Syncline Mining Area Study		Westmoreland, Pa.	19,415	PI	6,000
I	894	Piersons Run Watershed Boyce Park (Pa. # SL 157-1)		Allegheny, Pa.		DP	150
I	906	Chalfont Run Watershed Study (Pa. #SL 140)		Allegheny, Pa.		PI	500
I	911	Cucumber Run Watershed (Pa. # 138) Ohiopyle State Park		Fayette, Pa.	3,950	DP	635
I	907	Snowy Laurel Creek Demonstration Project (Joint EPA/W. Va.)		Preston, W. Va.		I	Not Available

ABANDONED MINE DRAINAGE ABATEMENT

SUBREGION: Monongahela

PROJECTS (BY STATE):

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	E.P.A. SITE NO.	COUNTY	NET ACIDITY (PPD)	TYPE OF EFFORT	ESTIMATED TOTAL COSTS ($ 000)
I	892	Cherry Creek Watershed (Md# 217, 218, 805, 808, 809, 810, 902, 904)		Garrett, Md.	760	I	351
I	899	Youghiogheny River Watershed (Md# 030,047)		Garrett, Md.	35	I	55
I	900	North Branch Casselman River Watershed (Md# 208, 209, 210, 211, 212, 269, 271, 272)		Garrett, Md.	212	I	553
I	901	South Branch Casselman River Watershed (Md# 242, 251, 266)		Garrett, Md.	674	I	158
I	908	PA # SL 103-2 Melcroft Mine Complex, Indian Creek Study		Fayette, Pa.	8,144 1,000 4,040	PI	Not Available
I	681	PA # SL 103-2 Pen Mar Mine, Casselman River Study		Somerset, Pa.	1,248	PI	100
I	909	PA # SL 103-2 Shober Ponfeigh Mine Casselman River Study		Somerset, Pa.	4,093	PI	500
I	903	PA # SL 103-2 Shamrock Mine Casselman River Study		Somerset, Pa.	1,130	PI	500
I	904	PA # SL 103-2 Mining Area Wilson Creek Study		Somerset, Pa.	1,290	PI	250

DOMESTIC SEWAGE FACILITY NEEDS
FOR IMPLEMENTATION

STATE: Maryland
SUBREGION: Monongahela

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	TYPE OF EFFORT	COUNTY	FUNCTIONAL NEEDS ADDRESSED	STATUS	ESTIMATED TOTAL COSTS
I	422	Oakland STP and Collection System	I	Garrett/MD	WQC	Step II Complete	$1,500,000 (1973)
I	420	Friendsville STP and Collection System	I	Garrett/MD	WQC	Under Construct	$1,500,000 (1973)
I	829	Grantsville STP and Collection System	I	Garrett/MD	WQC	Step II Underway	Not available

DOMESTIC SEWAGE FACILITY NEEDS FOR IMPLEMENTATION

STATE: Pennsylvania
SUBREGION: Monongahela

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	TYPE OF EFFORT	COUNTY	FUNCTIONAL NEEDS ADDRESSED	STATUS	ESTIMATED TOTAL COSTS
I	409	North Huntingdon Township Authority	I	Westmoreland/PA	WQC	PI, DP Completed	$10,800,000
I	405	Hempfield Township Municipal Authority (N&S Greensburg)	I	Westmoreland/PA	WQC	PI, DP Completed	4,079,100
I	429	Pennsylvania Township Sewage Authority	I	Westmoreland/PA	WQC	PI, DP Completed	2,564,700
I	425	West Mifflin Borough	I	Allegheny/PA	WQC	PI, DP Completed	977,500
I	448	Pigeon Creek Sanitary Authority	I	Washington/PA	WQC	PI, DP Completed	5,173,000
I	442	East Bethlehem Township Municipal Authority	I	Washington/PA	WQC	PI, DP Completed	2,826,000
I	830	Lower Ten Mile Joint Sewer Authority	I	Green/PA	WQC	PI, DP Completed	5,105,200
I	831	Unity Township Municipal Authority	I	Westmoreland/PA	WQC	PI, DP Completed	4,149,200
I	832	North Union Township Municipal Services Authority	I	Fayette/PA	WQC	PI, DP Completed	12,235,600
I	833	Brave Water and Sewer Authority	I	Green/PA	WQC	PI, DP Completed	679,900
I	464	Dukard-Bobtown Municipal Authority	I	Green/PA	WQC	PI, DP Completed	684,500

DOMESTIC SEWAGE FACILITY NEEDS

STATE: Pennsylvania
SUBREGION: Monongahela

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	TYPE OF EFFORT	COUNTY	FUNCTIONAL NEEDS ADDRESSED	STATUS	ESTIMATED TOTAL COSTS
I	405	Hempfield Township Municipal Authority (East of Manor)	I	Westmoreland/PA	WQC	PI, DP Completed	$ 830,000
I	461	George Creek Municipal Authority	I	Fayette/PA	WQC	PI, DP Completed	1,842,400
I	416	Rockwood Borough	I	Somerset/PA	WQC	PI, DP Completed	253,800
I	834	Municipal Authority of the Borough of Somerset	I	Somerset/PA	WQC	PI, DP Completed	332,400
I	835	Laurel Highlands Municipal Authority	I	Somerset/PA	WQC	PI, DP Completed	500,000

DOMESTIC SEWAGE FACILITY NEEDS FOR IMPLEMENTATION

STATE: West Virginia
SUBREGION: Monongahela

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	TYPE OF EFFORT	COUNTY	FUNCTIONAL NEEDS ADDRESSED	STATUS	ESTIMATED TOTAL COSTS
I							
I	500	Deckers Creek PSD	DP, I	Monongalia/WV	WQC	PI, completed	DP - 107,333 I - 1,500,000
I	515	Lost Creek — Mount Clare PSD	PI	Harrison/WV	WQC	not started	PI - 13,333
I	836	Arbuckle PSD	I		WQC	PI, DP Completed	I - 1,558,581
I	452	Fairmont	DP, I	Marion/WV	WQC	PI,completed	DP - 324,000 I - 3,673,400
I	489	Westover	DP	Monongalia/WV	WQC	PI,completed	DP - 110,000
I	482	Mason Town	PI	Preston/WV	WQC	not started	PI - 10,667
I	837	Crum	DP		WQC	PI,completed	DP - 52,907
I	838	Southwestern PSD	PI		WQC	not started	PI - 31,000
I	509	Anmoore	DP	Harrison/WV	WQC	PI,completed	DP - 50,000
I	839	Lake Lloyd PSD	DP		WQC	PI,completed	DP - 32,507
I	514	Lumberport	DP	Harrison/WV	WQC	PI,completed	DP - 100,800
I	518	Jane Lew	DP, I	Lewis/WV	WQC	PI,completed	DP - 59,000 I - 1,980,000
I	440	Elkins	PI, DP, I	Randolph	WQC	Not Started	Not Available
I	520	Albright	PI, DP, I	Preston	WQC	Not Started	Not Available
I	506	Worthington	PI, DP, I	Marion	WQC	Not Started	Not Available
I	494	Morgantown	PI, DP, I	Monongalia	WQC	Not Started	$ 4,773,000

DOMESTIC SEWAGE FACILITY NEEDS FOR IMPLEMENTATION

STATE: West Virginia
SUBREGION: Monongahela

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	TYPE OF EFFORT	COUNTY	FUNCTIONAL NEEDS ADDRESSED	STATUS	ESTIMATED TOTAL COSTS
I	450	Ossage	PI, DP	Monongalia/WV	WQC	Not Started	PI - 10,000 DP - 615,125
I	524	Kingwood	DP	Preston/WV	WQC	PI,completed	DP - 50,667
I	487	Granville	PI	Monongalia/WV	WQC	Not Started	PI - 15,000
I	840	Whitehall PSD	PI, DP		WQC	Not Started	PI - 15,000 DP - 120,000
I	460	Jacksons Mill	DP, I	Lewis/WV	WQC	PI, completed	DP - not available I - 63,306
1	507	Clarksburg	PI, DP, I	Harrison/WV	WQC	Not Started	PI - 25,000 DP - not available I - 366,000
I	841	Midland PSD	DP		WQC	PI, completed	DP - 103,815
I	842	Paw Paw PSD	DP	Morgan/WV	WQC	PI, completed	DP - 176,000
I	483	Mannington	PI	Marion/WV	WQC	Not Started	PI - 42,666
I	496	Grant-Union PSD	DP	Marion/WV	WQC	PI, completed	DP - 200,000
I	488	Barrackville	DP	Marion/WV	WQC	PI, completed	DP - 120,000
I	522	Thomas	PI, DP, I	Tucker	WQC	Not Started	Not Available
I	444	Huttonsville Correction Center	DP, I	Randolph	WQC	Completed	Not Available
I	441	Beverly	DP, I	Randolph	WQC	Completed	$ 1,258,200

DOMESTIC SEWAGE FACILITY NEEDS FOR IMPLEMENTATION

STATE: West Virginia
SUBREGION: Monongahela

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	TYPE OF EFFORT	COUNTY	FUNCTIONAL NEEDS ADDRESSED	STATUS	ESTIMATED TOTAL COSTS
I	513	Nutter Fork	PI, DP	Harrison/WV	WQC	Not Started	PI - 1,000 DP - 25,000
I	459	Stonewood	I	Harrison/WV	WQC	PI, DP Completed	I - 196,000
I	486	Kings Mill Valley PSD	DP	Marion/WV	WQC	PI, completed	DP - 160,000
I	508	Hepzibah	PI, DP	Harrison/WV	WQC	Not Started	PI - 50,000 DP - 100,000
I	477	Huttonsville	DP, I	Randolph/WV	WQC	PI, Completed	DP - 72,716 I -1,176,031
I	529	Bruceton Mills	PI, DP	Preston/WV	WQC	Not Started	PI - 119,000 DP - 100,500
I	511	West Milford	DP	Harrison/WV	WQC	PI, Completed	DP - 31,000
I	521	Tunnelton	DP	Preston/WV	WQC	PI, Completed	DP - 77,627
I	456	Hopemont State Hospital	DP, I	Preston/WV	WQC	PI, Completed	DP - 23,160 I - 134,627
I	445	Junior	I	Barbour/WV	WQC	PI, DP Completed	I - 439,323
I	446	Colfax	PI, DP	Marion/WV	WQC	Not Started	PI - 25,000 DP - 250,000
I	470	Philippi	PI	Barbour/WV	WQC	Not Started	PI - 14,000
I	907	Snowy Laurel Creek Mine Reclamation	DP	Preston	WQC	Preparing Proposal	Not Available

DOMESTIC SEWAGE FACILITY NEEDS FOR IMPLEMENTATION

STATE: Maryland
SUBREGION: Monongahela

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	TYPE OF EFFORT	COUNTY	FUNCTIONAL NEEDS ADDRESSED	STATUS	ESTIMATED TOTAL COSTS
I	417	Accident		Garrett/MD	WQC		
I	418	Crellin		Garrett/MD	WQC		
I	419	Deer Park		Garrett/MD	WQC		
II	421	Garrett County Sewer District, Loch Lynn Heights		Garrett/MD	WQC		
I	886	Thayerville		Garrett/MD	WQC		
I	887	McHenry		Garrett/MD	WQC		

DOMESTIC SEWAGE FACILITY NEEDS FOR IMPLEMENTATION

STATE: Pennsylvania
SUBREGION: Monongahela

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	TYPE OF EFFORT	COUNTY	FUNCTIONAL NEEDS ADDRESSED	STATUS	ESTIMATED TOTAL COSTS
II	844	Rostraver Twp. Webster		Westmoreland/PA	WQC		375,000
II	845	Youghiogheny Sanitary Authority		Fayette/PA	WQC		
II	846	Connellsville		Fayette/PA	WQC		$18,088,000
II	847	Fayette City		Fayette/PA	WQC		7,058,000
II	848	Sutersville		Westmoreland/PA	WQC		
II	849	Smithton		Westmoreland/PA	WQC		
II	850	Hempfield and Sewickley Twp.		Westmoreland/PA	WQC		
II	851	Hammondsville Sewage Disposal System		Fayette/PA	WQC		764,000
II	852	Markleysburg Sewage Disposal System		Fayette/PA	WQC		816,000
II	853	Farmington Sewage Disposal System		Fayette/PA	WQC		593,000
II	854	Deer Lake Sewage Disposal System		Fayette/PA	WQC		1,421,000
II	855	Mill Run Sewage Disposal System		Fayette/PA	WQC		862,000
II	856	Normalville Sewage Disposal System		Fayette/PA	WQC		525,000

DOMESTIC SEWAGE FACILITY NEEDS FOR IMPLEMENTATION

STATE: Pennsylvania
SUBREGION: Monongahela

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	TYPE OF EFFORT	COUNTY	FUNCTIONAL NEEDS ADDRESSED	STATUS	ESTIMATED TOTAL COSTS
*II	857	Indiana Head-Millertown Sewage Disposal System		Fayette/PA	WQC		816,000
II	858	Melcroft Sewage Disposal System		Fayette/PA	WQC		517,000
II	859	White Sewage Disposal System		Fayette/PA	WQC		309,000
II	860	Champion Sewage Disposal System		Fayette/PA	WQC		916,000
II	861	Bear Rocks Sewage Disposal System		Fayette/PA	WQC		2,579,000
II	862	South Huntington Twp: Yukon		Westmoreland/PA	WQC		360,000
II	830	Lower Ten Mile Joint Sewage Authority		Greene, Washington/PA	WQC		
II	833	Brave Water and Sewer Authority		Greene/PA	WQC		
II	863	Municipal Authority of Bethel		Allegheny/PA	WQC		
II	864	Dunlap Creek Regional Sewage Disposal System		Fayette/PA	WQC		13,702,000
II	865	Sanitary Authority of Elizabeth Twp: Buena Vista		Allegheny/PA	WQC		

DOMESTIC SEWAGE FACILITY NEEDS FOR IMPLEMENTATION

STATE: Pennsylvania
SUBREGION: Monongahela

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	TYPE OF EFFORT	COUNTY	FUNCTIONAL NEEDS ADDRESSED	STATUS	ESTIMATED TOTAL COSTS
*II	866	Elizabeth Borough Municipal Authority and Fallen Timber Run Drainage		Allegheny/PA	WQC		
II	867	Pleasant Hills Authority		Allegheny/PA	WQC		
II	868	Waynesburg Borough		Greene/PA	WQC		
II	869	West Elizabeth Borough		Allegheny/PA	WQC		
II	870	West Pike Nun Twp.		Washington/PA	WQC		
II	871	City of Jeannette		Westmoreland/PA	WQC		
II	872	Perryopolis Area Sewage Disposal System		Fayette/PA	WQC		$ 2,403,000
II	873	Brownsville Area Disposal System		Fayette/PA	WQC		1,597,000
II	874	Briar Hill Interim Sewage Disposal System		Fayette/PA	WQC		3,906,000
II	875	Point Marion Area Sewage Disposal System		Fayette/PA	WQC		1,157,000
II	876	Smithfield Area Sewage Disposal System		Fayette/PA	WQC		1,863,000
II	877	Fairchance Area Sewage Disposal System		Fayette/PA	WQC		4,095,000
II	878	Greater Point Marion-Besser Hill		Fayette/PA	WQC		965,000

*From county and regional plans

DOMESTIC SEWAGE FACILITY NEEDS FOR IMPLEMENTATION

STATE: Pennsylvania
SUBREGION: Monongahela

PRIORITY GROUP	MAP ID	PROJECT OR PROGRAM	TYPE OF EFFORT	COUNTY	FUNCTIONAL NEEDS ADDRESSED	STATUS	ESTIMATED TOTAL COSTS
II	879	New Geneva-Friendship Heights		Fayette/PA	WQC		$ 1,291,000
II	880	Uniontown Regional Disposal System		Fayette/PA	WQC		29,001,000
II	881	Peters Creek Sewage System		Washington/PA	WQC		
II	882	Marianna, West Bethlehem Twp. Sewage System		Washington/PA	WQC		
II	883	Jefferson Boro: West Elizabeth		Allegheny/PA	WQC		800,000
II	884	Jefferson Boro: Peters Creek		Allegheny/PA	WQC		2,150,000
II	885	Beallsville Boro		Allegheny/PA	WQC		300,000

*From county and regional plans

Glossary

State or Commonwealth

Md.	Maryland
Pa.	Pennsylvania
W. Va.	West Virginia

Federal Department or Agency

ARMY	U. S. Army Corps of Engineers
BEA	Bureau of Economic Analysis, Department of Commerce
BOM	Bureau of Mines, Department of the Interior
BOR	Bureau of Outdoor Recreation, Department of the Interior
DOT	Department of Transportation
EPA	Environmental Protection Agency
ERDA	Energy Research and Development Administration
ERS	Economic Research Service, Department of Agriculture
FPC	Federal Power Commission
FS	Forest Service, Department of Agriculture
FWS	Fish and Wildlife Service, Department of the Interior
HEW	Department of Health, Education and Welfare
HUD	Department of Housing and Urban Development
MA	Maritime Administration, Department of Commerce
NPS	National Park Service, Department of the Interior
SCS	Soil Conservation Service, Department of Agriculture
USDA	Department of Agriculture
USDI	Department of the Interior
USGS	Geological Survey, Department of the Interior
WRC	Water Resources Council

Commissions

ARC	Appalachian Regional Commission
CAC	Citizens' Advisory Council to Ohio River Basin Commission
ORBC	Ohio River Basin Commission
ORSANCO	Ohio River Valley Water Sanitation Commission

General Terms

CCJP	Comprehensive Coordinated Joint Plan
CPS	Continuous Planning System
ID	Map Identification Number
M&I	Municipal and Industrial Water Supply
NPDES	National Pollutant Discharge Elimination System
OBERS	Bureau of Economic Analysis and Economic Research Service joint population and economic projections
PSA	Power Supply Area
SMSA	Standard Metropolitan Statistical Area

Functional Needs Addressed

FDA	Flood Damage Abatement
NHR	Natural, Historic, Recreation
P	Power
T	Transportation
WQC	Water Quality Control
WS	Water Supply

Recommended Plan (Status)

DP	Detailed Planning
I	Implementation
PI	Preliminary Investigation
RD	Research and Data Collection

Principles and Standards

EQ	Environmental Quality Plan
NED	National Economic Development Plan
RA	Recommended Alternative Plan

Priority Group

I	Recommended within next 5 years
II	Recommended within 6 through 15 years
III	Recommended sometime beyond 15 years

Measurement Units

a.f.	acre-feet
btm	billion ton miles
BTU	British Thermal Unit
cfs	cubic feet per second
GWH	Gigawatt hour
kw	kilowatt
kwh	kilowatt hour
mgd	million gallons per day
mg/l	milligram per liter
MW	megawatt

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